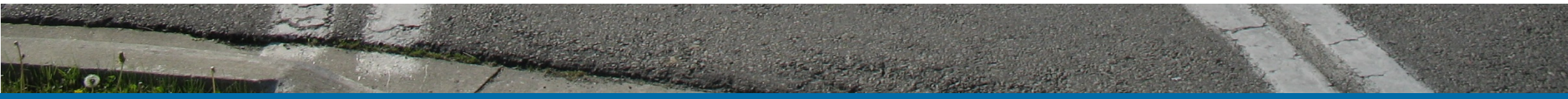
MILTON

Asset Management Plan 2021



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Introduction

In 2000, the Town of Milton set out on a path of growth that saw a small Town of 32,500 residents evolve into a dynamic, modern and innovative community of approximately 125,000 residents today. Growth is expected to continue at a rapid pace with the population anticipated to reach 235,000 by 2031 based on the Region of Halton's best planning estimates. The Town currently owns over $2 billion worth of transportation and stormwater tangible capital assets based on current replacement values, much of which is relatively new given the rapid growth of the community.

This Asset Management Plan covers both the Town's Transportation System and its Stormwater System. The asset types for each are illustrated below in a parent-child relationship called the asset hierarchy. Using an asset hierarchy helps the Town organize and manage its library of asset information to support decision-making. The subsequent chapters in this plan will provide information with the same structure that is detailed in Table ES1 below.

Table ES1: The Hierarchy of Assets Included in the Town's 2020 Corporate Asset Management Plan

Program Area	Asset Type	Asset
Transportation System	**Roads & Right-of-Way**	**Road Network**
		Retaining Walls
		Sidewalks
		Guard Rails
		Walkways/Trails
		Gateway Features
	Structures	**Bridges**
		Culverts
	Traffic	**Streetlights**
		Traffic Signs
		Traffic Signals
Stormwater System	**Stormwater Network**	**Stormsewers**
		Manholes & Catchbasins
	Stormwater Management Facilities	**Storm Ponds**
		Oil/Grit Separators

Condition scores have been estimated for all Transportation and Stormwater assets in this report based on the best available data and converted to a 1-100 scale (100 being very good condition) for ease of comparison. Condition data can be collected from a variety of sources, the most reliable being from recent inspections. Based on the year the condition information was collected, the condition was degraded to provide an estimate of current condition. Where inspection and condition data is unavailable, condition was estimated based on the age of the asset and its estimated service life. While this method helps to provide a general understanding of the state of the infrastructure, it can underestimate the condition of asset portfolios as

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there are many assets that can continue to function beyond their anticipated service life, particularly if any renewal or rehabilitation work has been completed. The Town of Milton has developed an improvement roadmap, outlined in Section 9, that will aid in improving data confidence over time. Unless otherwise noted, the condition values used within the AMP are these converted and degraded scores.

State of Infrastructure

TRANSPORTATION

Transportation is a very significant aspect of human life. In order to move people, goods, and services from point A to point B, transportation assets must address several needs. This section summarizes the estimated replacement value of the infrastructure that the Town manages to support the provision of accessible, safe and reliable Transportation Services.

The Town of Milton's portfolio of infrastructure assets for Transportation Services is valued at $1,573 million, which includes the value of the assets and an additional 25% to cover contingency, design and project management. This breaks down into the roads and other right of way (ROW) assets portfolio with a value of $1,419 million, structures portfolio with a total value of $94 million and traffic portfolio valued at $60.2 million. These details are summarized along with their aggregated condition grades weighted by replacement value for each group in Table ES2 below. The overall average condition score (weighted by replacement value) for Transportation assets is 76. Details regarding specific condition values and supporting information sources is described in the proceeding sections.

Table ES2: Asset Valuations for the Transportation System (2020$, millions)

	Roads & ROW	Structures	Traffic
Total Replacement Value	$ 1,419	$ 94	$ 60.2
Average Condition Score	77	71	60

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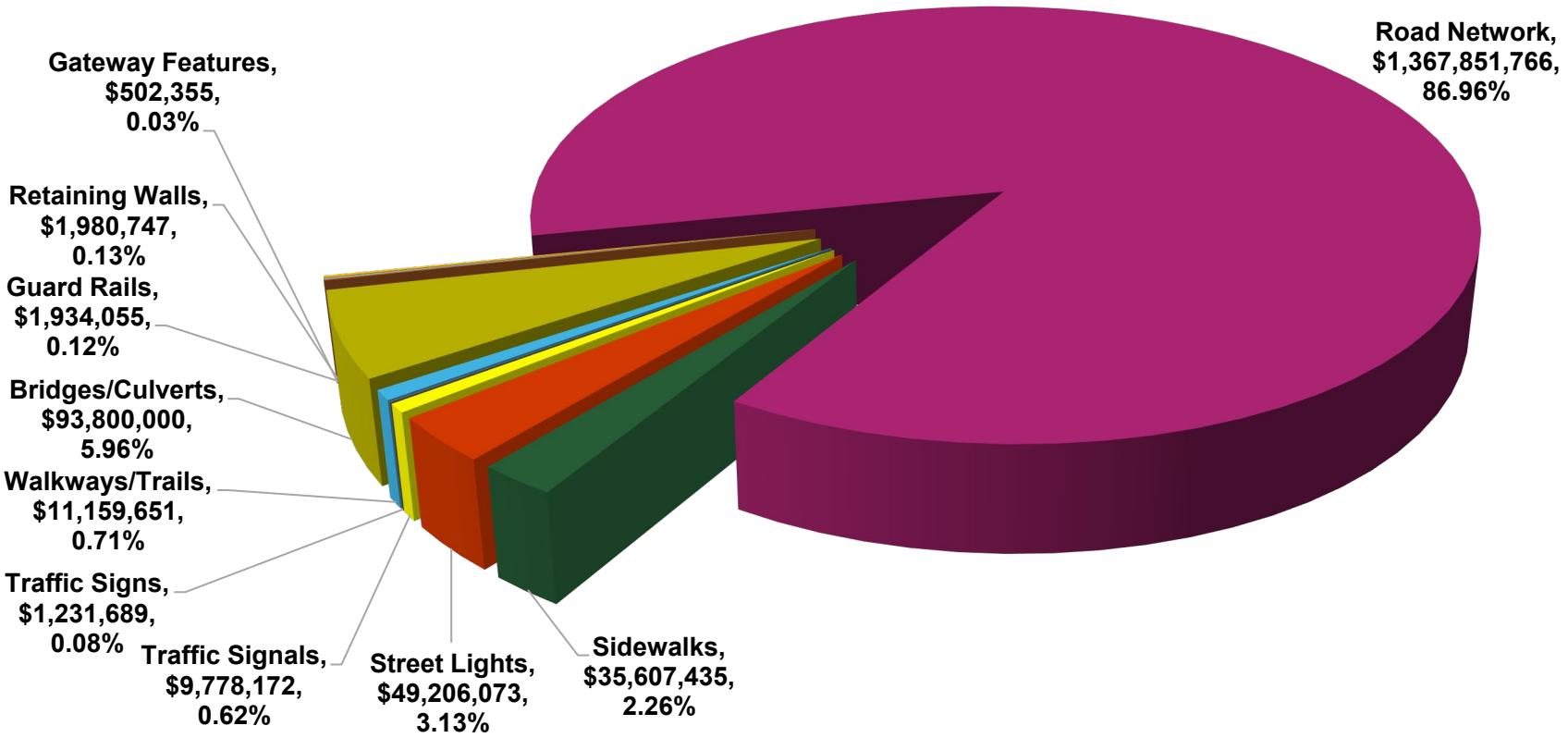

Figure ES1 Asset Replacement Value for all Asset Types in the Transportation System

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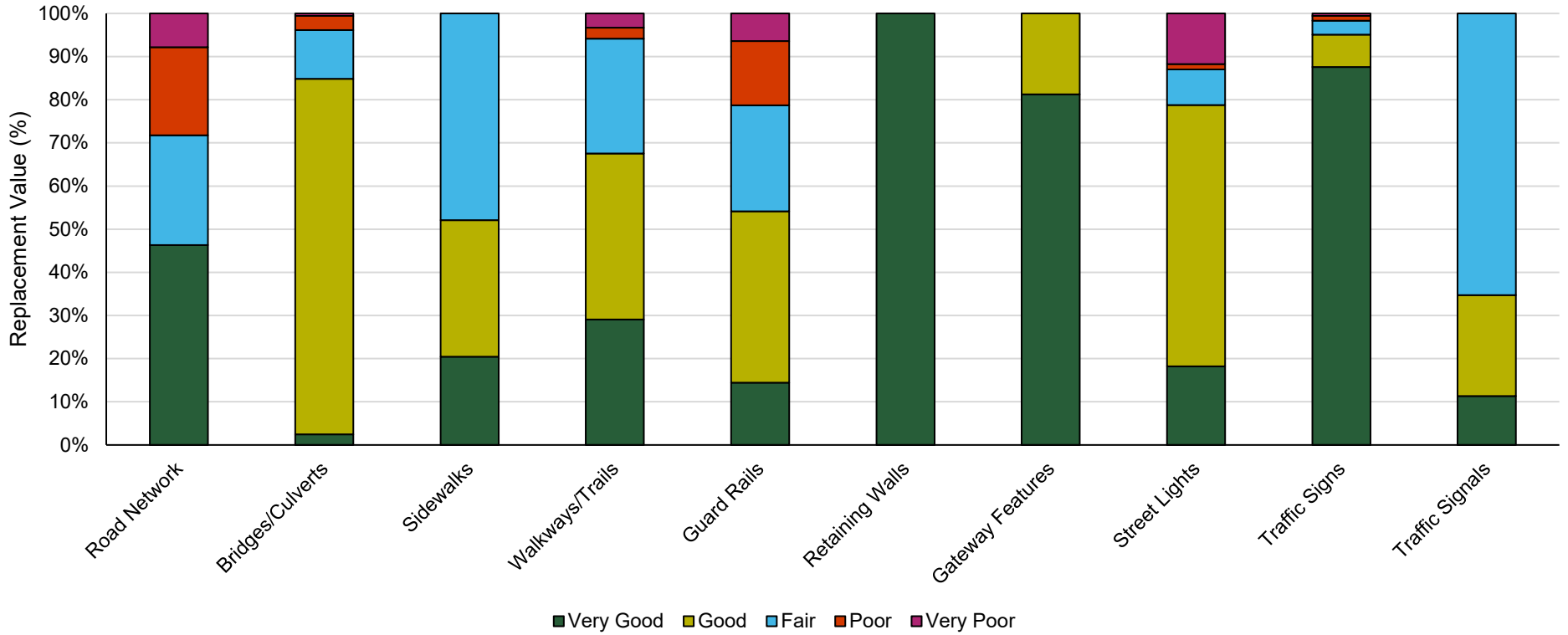

Figure ES2: Transportation System: Condition Score by Replacement Value

STORMWATER

Stormwater services are increasingly more important as the Town experiences more frequent and larger storms throughout the year in both summer and winter. Stormwater management reduces negative impacts to other infrastructure systems including the pollution levels for rural and urban lands that results from stormwater runoff. This is achieved with both management practices and physical structures. This section summarizes the various asset types included in this system, along with their estimated replacement value.

The Town of Milton's infrastructure assets for Stormwater Services is valued at $479.5 million in current-year dollars, which includes the value of the assets and an additional 25% to cover contingency, design and project management. This breaks down into the stormsewers network with a

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replacement value of $360million, storm ponds with a replacement value of $117million and oil/grit separators (OGS) with a replacement value of $1.9 million. These details are summarized along with their aggregated condition grades weighted by replacement value for each group in Table ES3 below. The overall average condition score (weighted by replacement value) for Stormwater assets is 82. Details regarding specific condition values and supporting information sources is described in the proceeding sections.

Table ES3: Asset Valuations for the Stormwater System (2020$, millions)

	Storm ponds	Storm Network	OGS
Total Replacement Value	$ 117.6	$ 360	$ 1.9
Average Condition Score	83	85	79

At the service level, the Town's Stormwater System is described in Figure ES3 below in terms of its current replacement costs by condition grade. The most significant assets in terms of replacement value are the stormsewers, valued at $271.7 million. The Town's stormponds have an estimated current replacement value of $117 million, the Town's manholes and catchbasins are valued at $88.2 million, and the oil/grit separators have a replacement value of approximately $1.9 million. The current lifecycle stage for each asset is illustrated in Figure ES3 weighted by replacement value.

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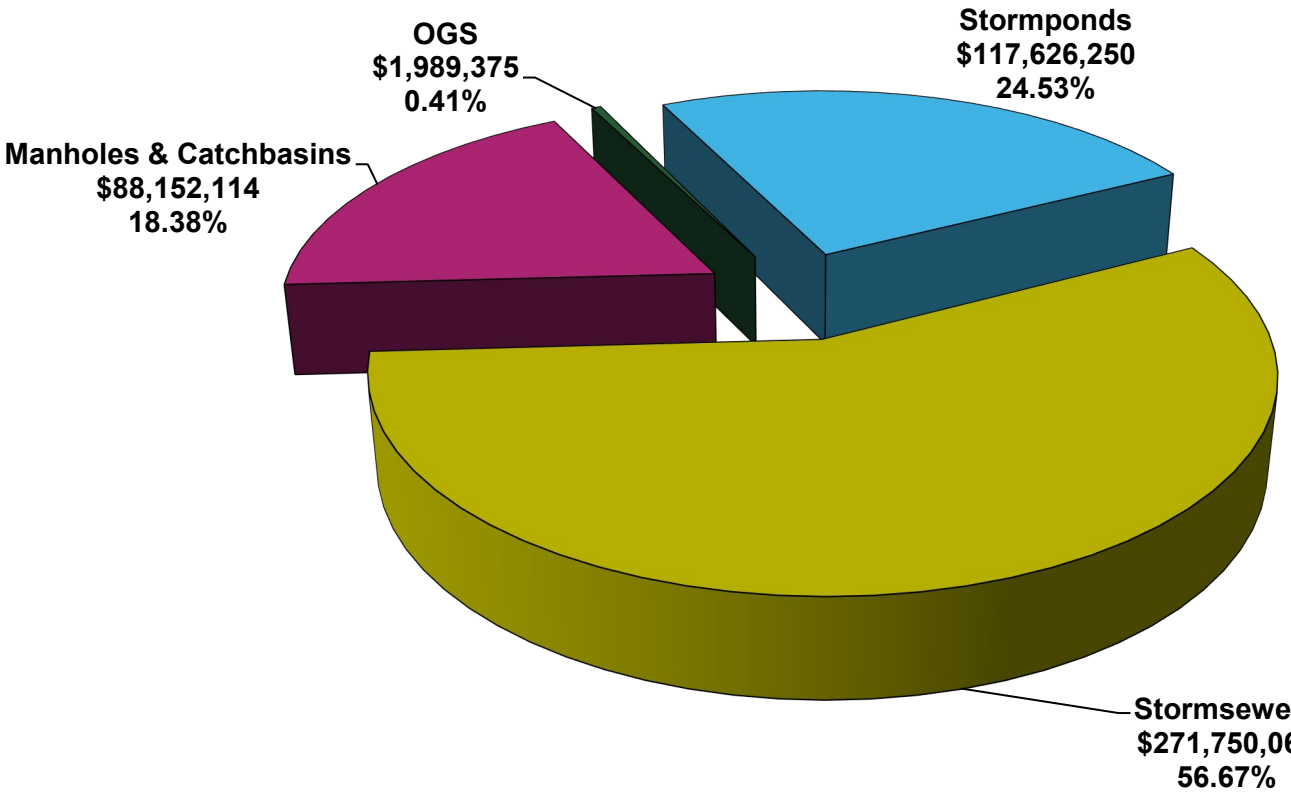

Figure ES3: Asset Replacement Value for all Asset Types in the Stormwater System

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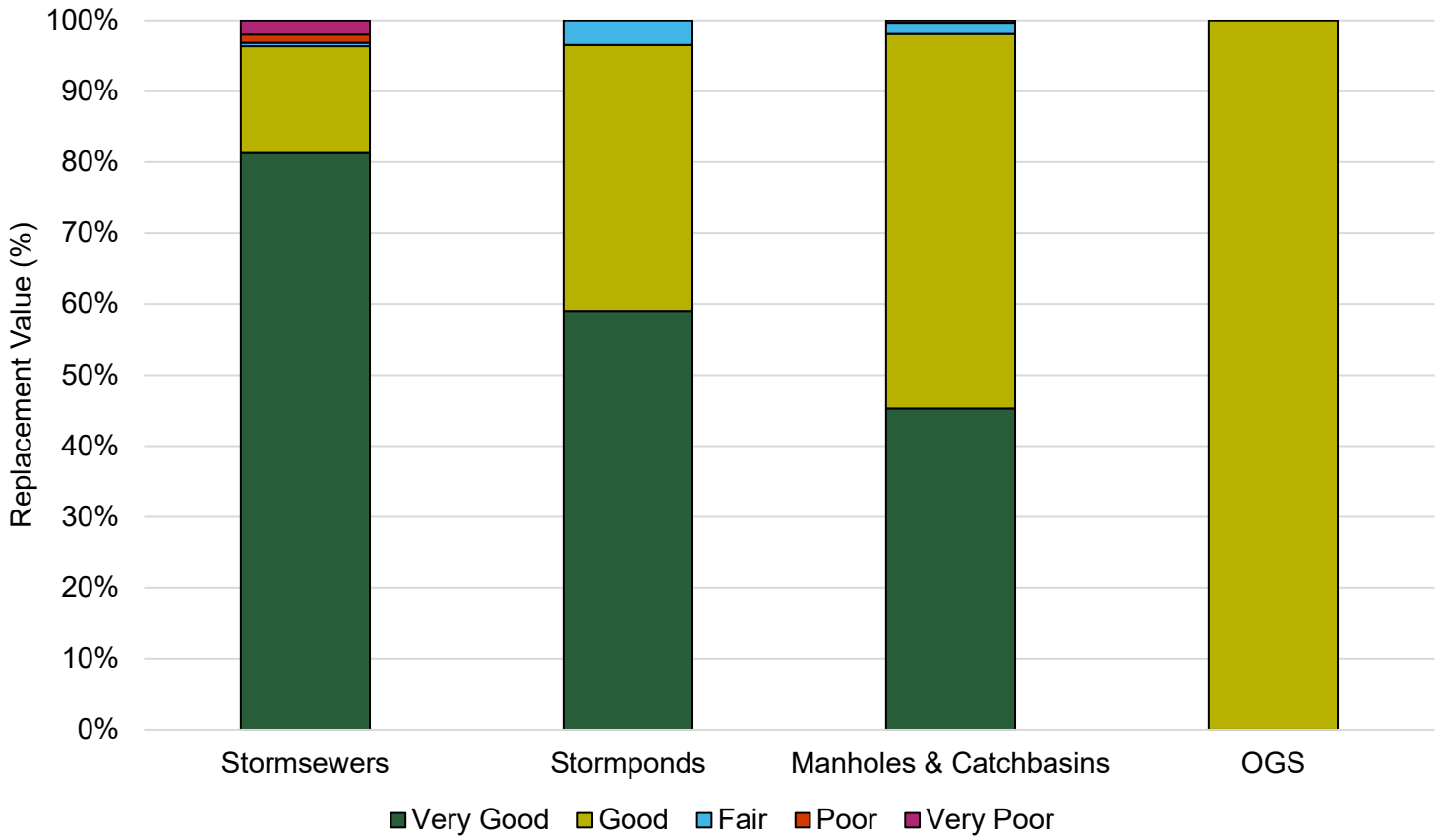

Figure ES4: Stormwater System: Condition Score by Replacement Value

Levels of Service

One of the major goals of asset management is to recognize and understand the balance between risks, performance and costs. Having clearly defined levels of services can result in:

- Everyone being able to identify the benefits of services provided as well as the associated costs.
- Allowing customers to consider the level of service provided by the Town of Milton within the context of affordability.

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- Informing customers of the level of service that is currently in place and any future changes to the level of services and associated costs.
- Measuring the Town of Milton's performance against all the defined level of service enclosed in this AMP.

The province of Ontario has implemented Asset Management Planning for Municipal Infrastructure Regulation, "O. Reg 588/17" as of January 1st, 2018. The purpose of this regulation is to help guide municipalities in planning and improving their future infrastructure.

O. Reg 588/17 requires two levels of service for core assets. The first is known as legislated community levels of service and the second is known as technical levels of service. Community level use qualitative data to explain the scope of service delivered by a specific asset category. For instance, a map that illustrates different condition of pavement, while technical levels of service use metrics to explain scope of service delivered by a specific asset category. For instance, the average bridges condition based on a condition index.

The Town has also developed level of service performance metrics to reflect citizen values and desires, classified by unique service attributes that summarize the type of service being provided to citizens, businesses, and the wider community. Their development indicates service areas have documented planned approaches for the operations and maintenance of these infrastructure assets. Best practices consider the trends of these performance indicators with respect to the various levels of investment being decreased, increased, or to be approximately equal in future years. These performance measures use financial and condition assessment data, and more advanced metrics that may include data the Town needs to collect.

Additional measures have been developed that are increasingly technical and intended for a deeper understanding of performance trends for various interested subject matter experts. These measures are provided to ensure decisions, especially those related to sustainability and vulnerabilities, are aligned with the most relevant and recent information about the Town's infrastructure. Without technically focused performance metrics, the benefits from ongoing capital and operational planning decisions may not be fully appreciated, despite a wide range of effort behind the scenes.

With the development of this AMP, the Town of Milton continues to focus on balancing customer needs, expectations and affordability. The vision for the Town is to establish critical level of service requirements, and to understand how costs and levels of service impact the range of services continually provided to citizens and businesses. The development of the level of service (LOS) tables in this AMP are maintained through communication of staff members in all service areas for each respective service.

Asset Lifecycle Management Strategy

Lifecycle activities are the specific activities that maintain an acceptable level of performance. Documenting lifecycle activities, including those currently being performed and those that the Town are looking to perform in the future, is an important part of this AMP because they provide guidance for decision-makers who are managing various asset types, across a wide-range of condition states.

As the Town progresses in the development of future AMPs, their knowledge and understanding about which activities work best will be continually improved. This continual improvement is supported by the collection and utilization of data that informs questions and answers about which activities work best and should be considered for each asset type, related to its current lifecycle state and various LOS performance metrics.

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Appropriate and cost-effective strategies and plans are foundational to ensure service sustainability and to reduce the risks associated with a wide-range of evolving vulnerabilities at different levels, including the asset level, the associated infrastructure type, system or network level, and ultimately at the overall service level for the program area.

Without a defined set of preferred lifecycle activities for each asset, strategies for operations, maintenance, and capital investment can become uncoordinated and less effective in terms of costs and quality. As such, the Town collects some performance information, and is working to improve this collection, to assess and review the strategies, objectives, and plans that are generated from these preferred activities, developed from internal and external partners who are involved in maintaining service excellence objectives.

Financial Strategy

SUSTAINING THE CURRENT ASSET PORTFOLIO WITH GROWTH

Long-term investment forecasts were developed using a 100-year horizon to illustrate the capital and operational needs across the entire asset lifecycle from creation to disposal and includes contingency, design, and project management costs. The purpose of providing these forecasts is to inform decision makers about the costs to maintain current levels of service, whereas costs to maintain future or desired levels of service will be included in future iterations of the Town's Corporate AM Plan.

For example, infrastructure systems constructed in the 1990's with an expected service life of 50-years will require investments before 2040. If those investment requirements are not addressed appropriately, current levels of service could potentially decline while the cost of operations and maintenance increase. The following 100-year forecasts aim to cover the entire lifecycle of the Town's assets to identify these trends.

Beyond the infrastructure currently built today, the Town of Milton has and will continue to grow at a rapid pace. The investment requirements for the Town's existing assets, with the growth in infrastructure defined by the Town's development plans included are on average $108 million per year to accommodate all lifecycle requirements over the next 100-years for both Transportation Services and Stormwater Services.

It is important to note that the infrastructure backlog is estimated to be approximately $126 million in 2021. This represents the replacement value of the assets that are operating beyond their expected service life. However, this backlog may be overstated as assets can continue to function past their estimated service life, particularly for assets in a "run to failure" mode of operation (for example, an industrial road with very low traffic). It is not expected that the Town will complete work at this scale, however, the scenario is meant to provide an understanding of overall infrastructure needs to allow the Town to plan and budget for addressing these needs over time.

Without budget constraints, this growth scenario prioritized asset renewals in the most effective year based on established lifecycle strategies. The resulting effect on asset condition is illustrated below in Figure ES5 for all assets in Transportation Services, and in Figure ES6 for all assets in Stormwater Services. Over the 100-year horizon, Transportation assets maintain an average condition of 74, whereas Stormwater assets have an average condition of 71.

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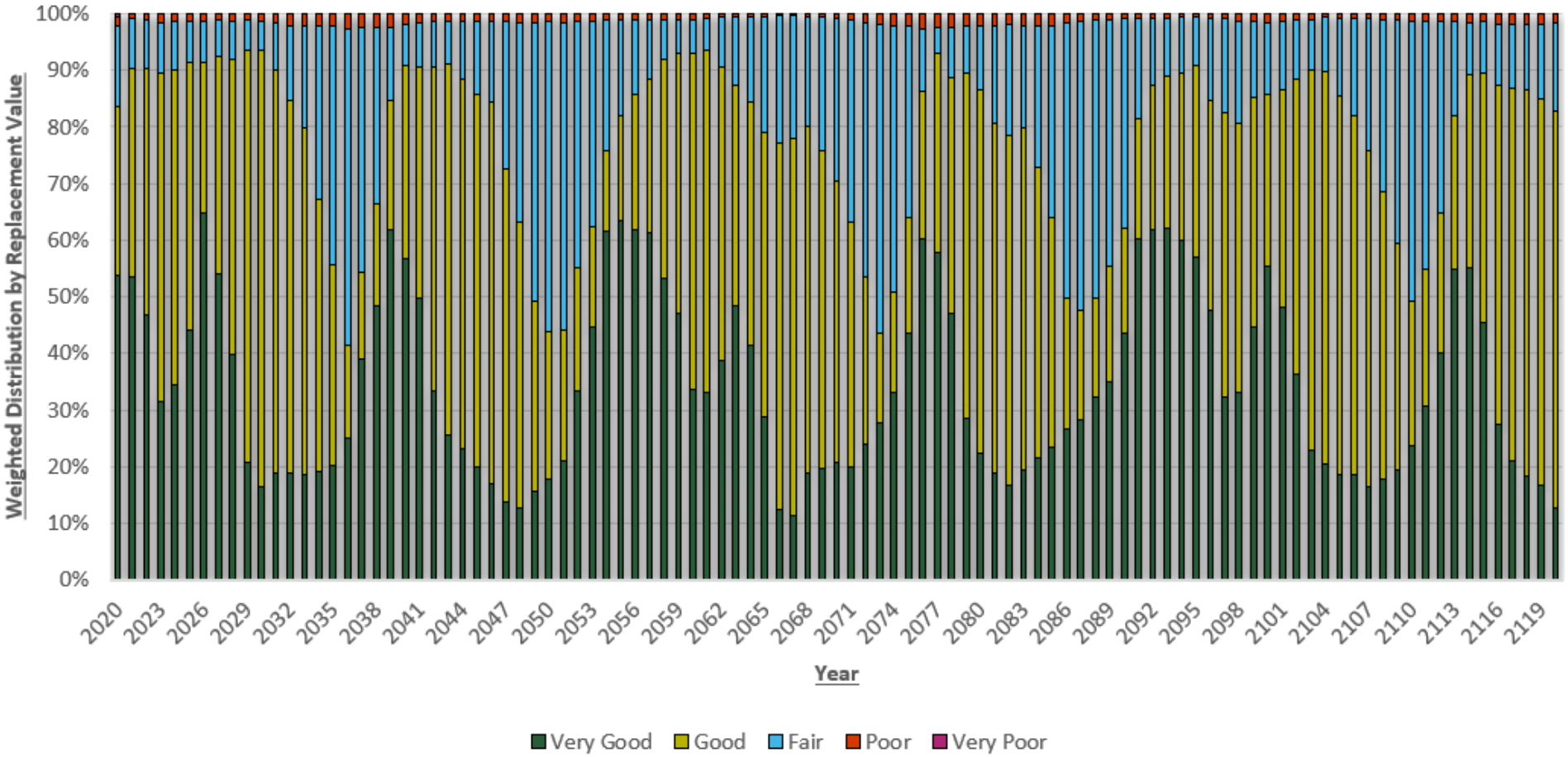

Figure ES5: Long-Term Condition Forecast, Unlimited Budget Scenario, Transportation Services, Existing and Growth Assets

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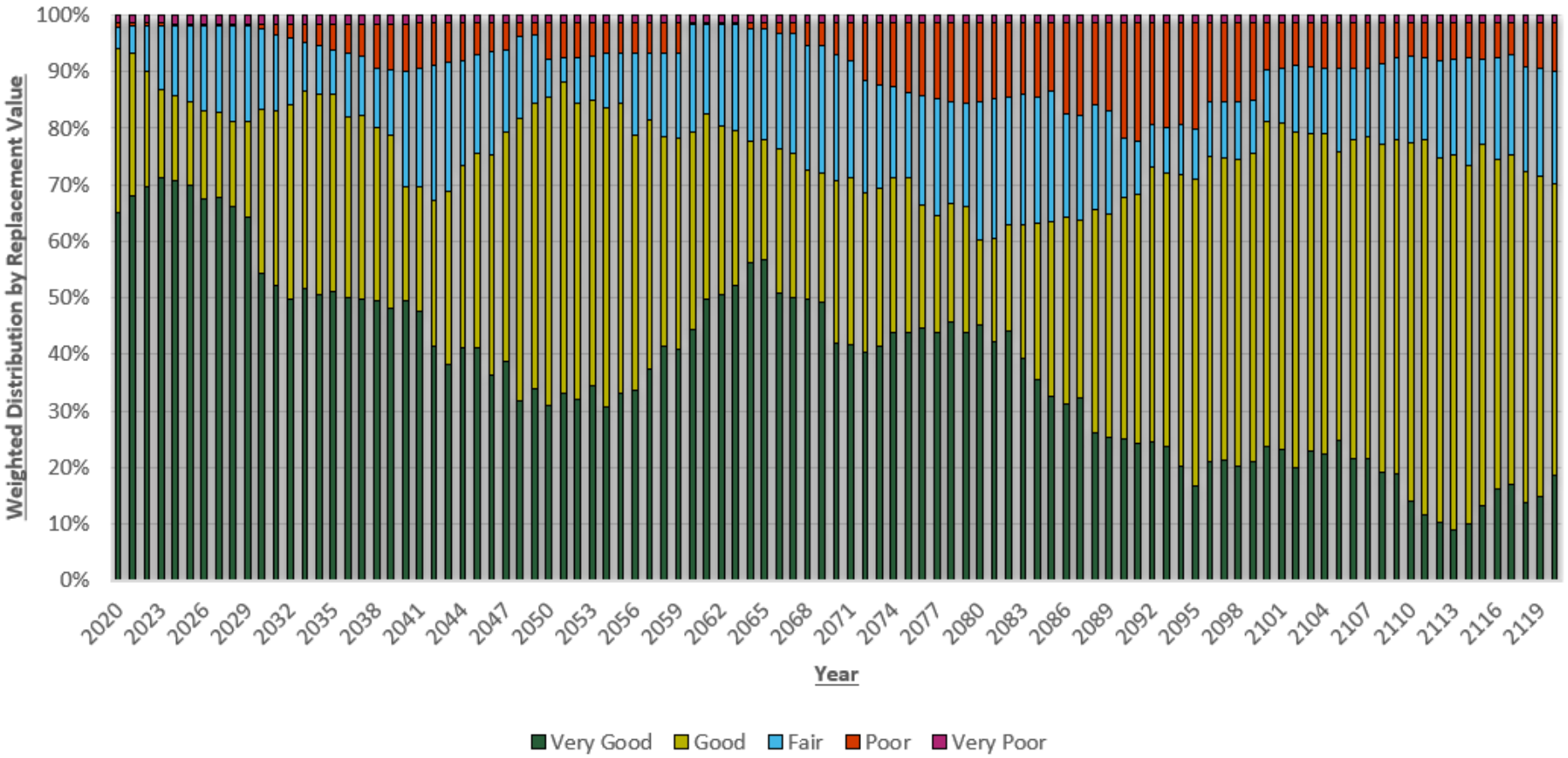

Figure ES6: Long-Term Condition Forecast, Unlimited Budget Scenario, Stormwater Services, Existing and Growth Assets

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THE EXPECTED IMPACTS OF CURRENT BUDGET LEVELS

While the previous financial forecast was developed with an unlimited budget to determine the average annual asset investment required to sustain the Town's current and future assets, this scenario provides information on the expected impacts from current investment levels.

The overall condition profile for Transportation Services is shown in Figure ES7, as well as the Stormwater Services in Figure ES8, which shows that stormwater assets start deteriorating after 2030. Without adequate investment levels to sustain the asset portfolios and levels of service, assets in very good condition slowly drop to good condition year over year, and the proportion of assets in fair, poor, and very poor condition increases. Over the next 100 years, the average condition of Transportation assets will be 69, whereas Stormwater assets will be reduced to 61. This forecast suggests the current levels of funding will not be adequate to maintain the Town's intended levels of service.

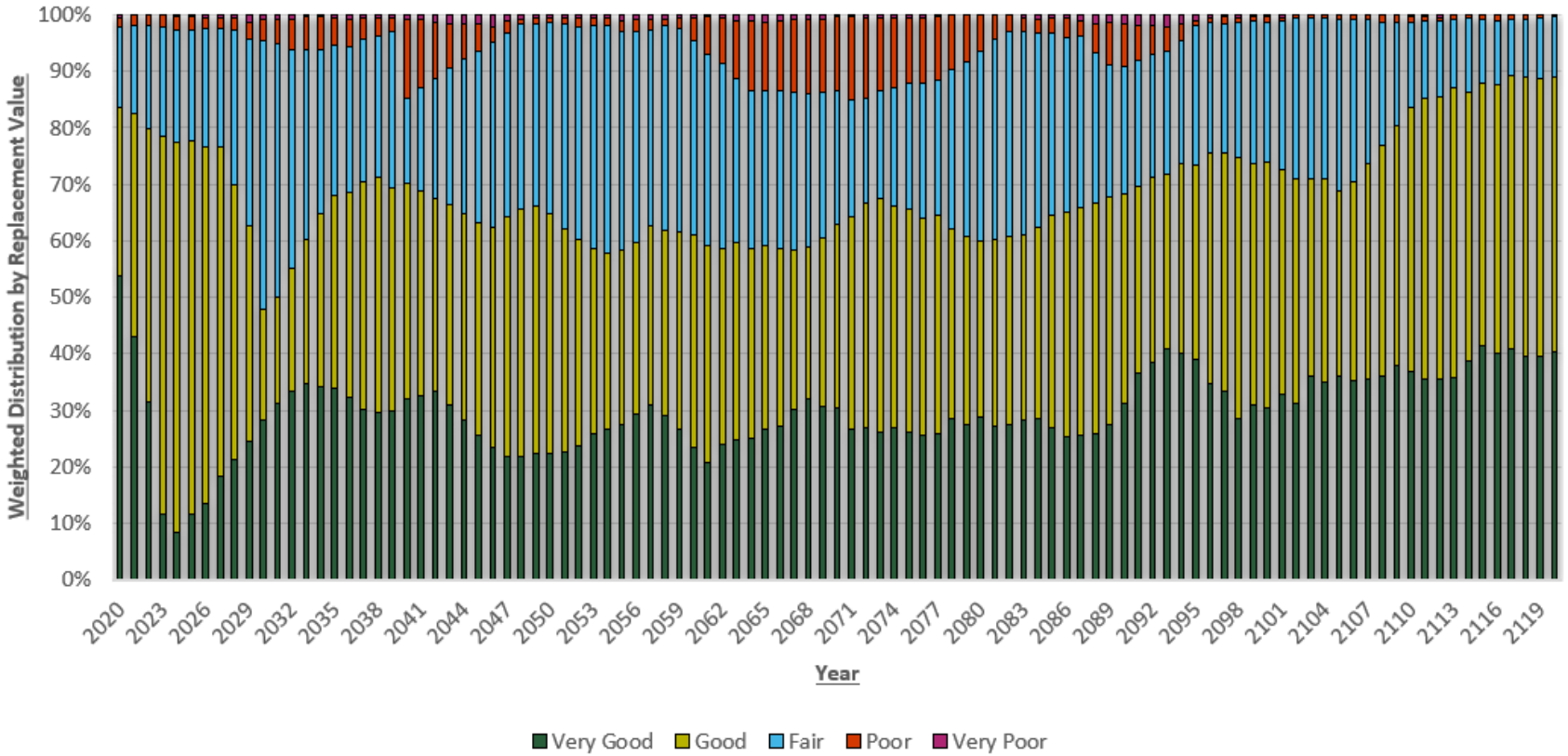

Figure ES7: Long-Term Condition Forecast, Current Budget Level Scenario, Transportation Services, Existing and Growth Assets

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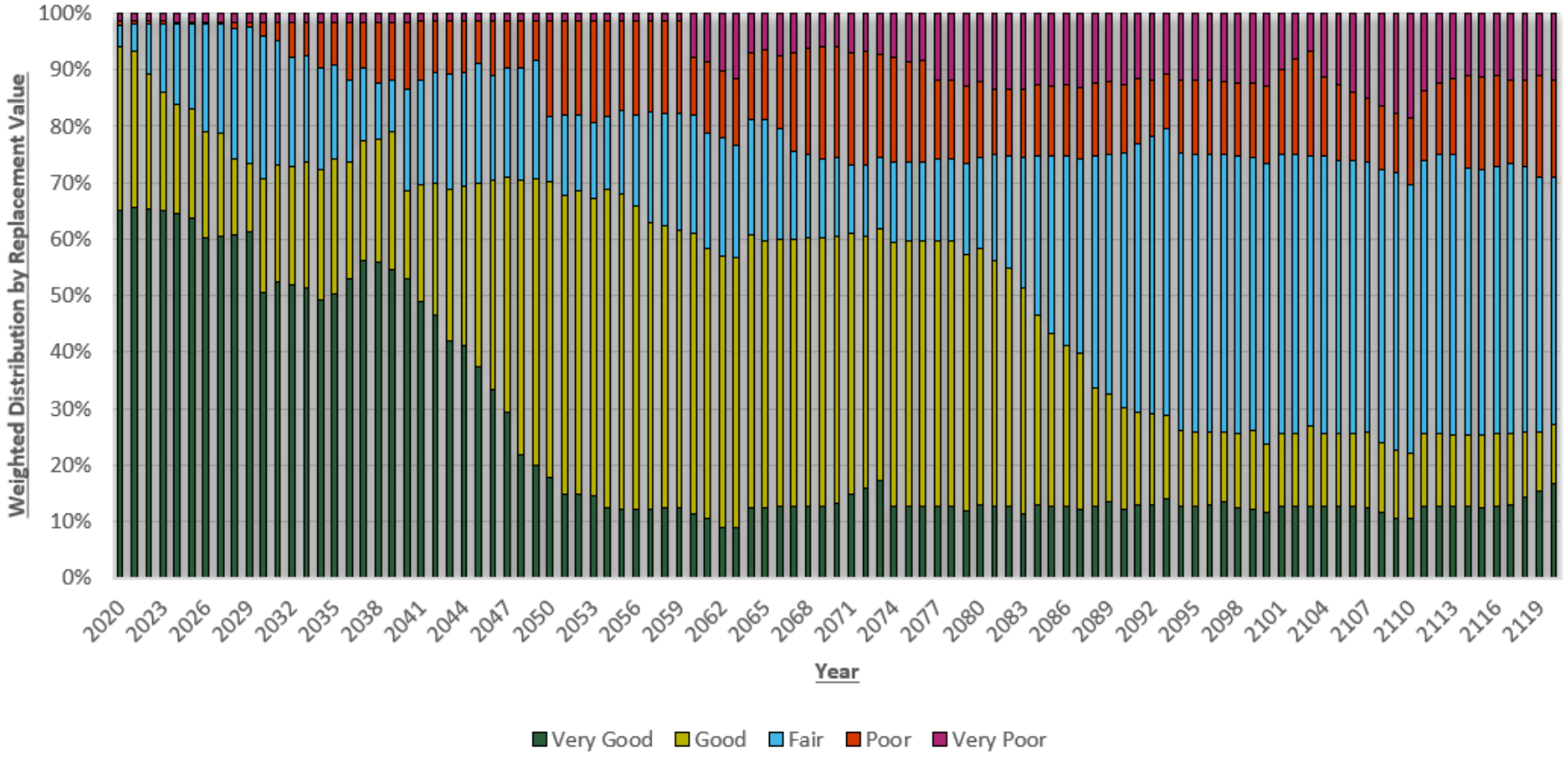

Figure ES8: Long-Term Condition Forecast, Current Budget Level Scenario, Stormwater Services, Existing and Growth Assets

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CONCLUSION

The information presented below in Figure ES9 illustrates the cumulative effect of the current infrastructure investments with the backlog spread across a 20 year period, compared to the cumulative funding available for these investments. Figure ES10 & Figure ES11 demonstrate the 20 year non-cumulative funding compared to non-growth and growth funding requirements respectively. As can be seen in Figure ES9 the current funding levels do not meet the cumulative investment requirements and without funding increases the cumulative deficit in funding for capital requirements in 20 years could grow to $200 million. After spreading the infrastructure backlog across a 20-year period, an annual increase of 7.5% to current funding levels was found to meet the total investment requirements. However, Figure ES10 demonstrates that the Town's current plan to increase the non-growth budget by $1 million per year would meet the non-cumulative 10 year average annual funding requirements by 2032 for existing assets.

For these reasons the Town may want to consider the utilization of a separate stormwater rate structure as has been adopted in several other municipalities. Such a strategy would allow for a distribution of cost that considers property characteristics that relate to the need for stormwater services through a new revenue stream. For example, industrial and commercial operations with large paved parking lots may pay a larger share for stormwater services, because the paved surfaces increase the surface water runoff that the Town's stormwater system must manage, especially as larger and more frequent storms are experienced from climate change.

Completion of this asset management plan is also an important step towards understanding the funding required to maintain these infrastructure systems. Further information in future iterations of the Town's AMP will continue to explore the range of potential and piloted options that the Town invests in to maintain a high quality of life for its residents, visitors, and businesses.

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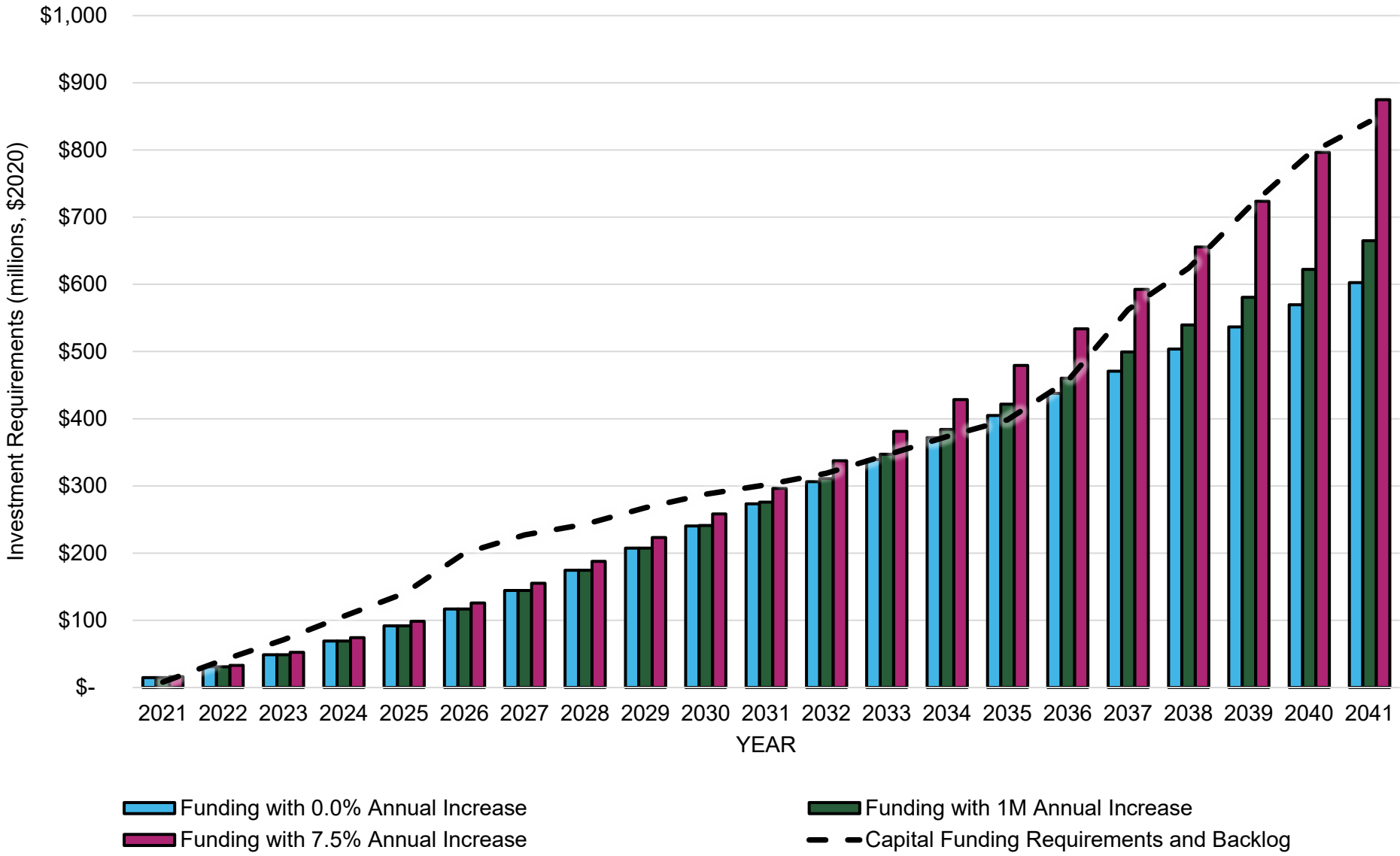

Figure ES9: 20-Year Cumulative Capital Investments vs. Revenues (millions, 2020$)

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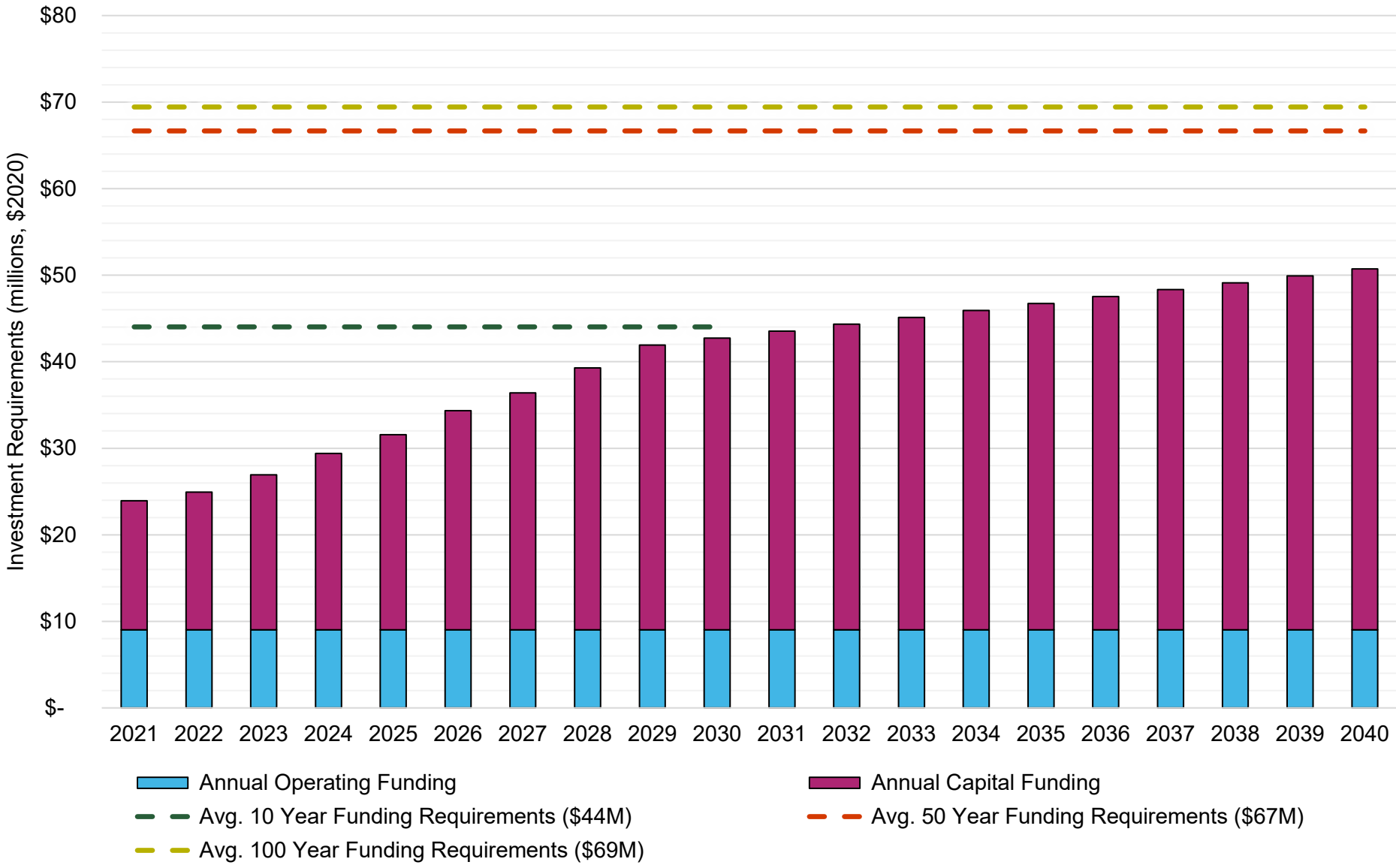

Figure ES10: Non-Growth Infrastructure Financing to Lifecycle Funding Requirements – Capital & Operating (millions, 2020$)

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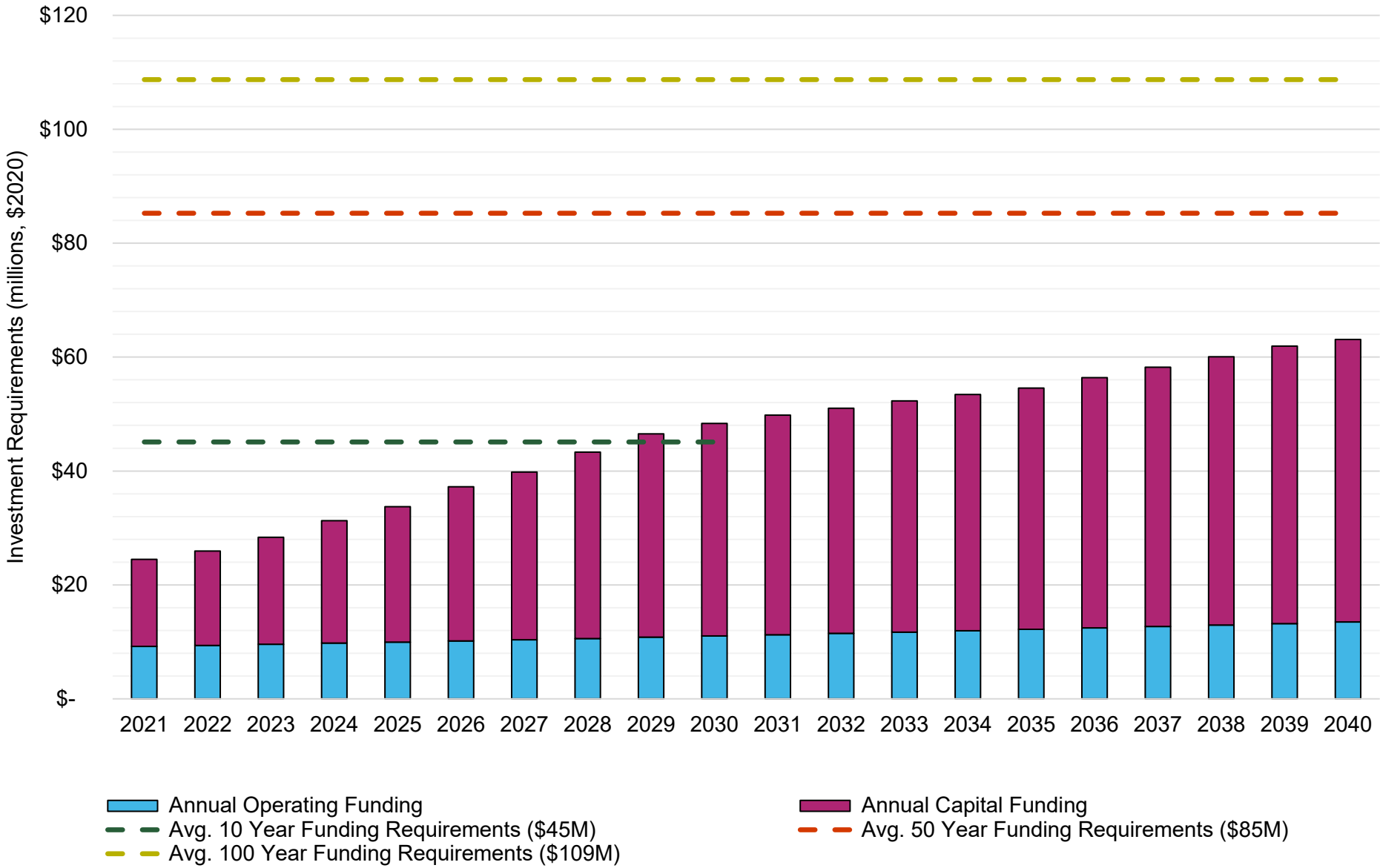

Figure ES11: Growth Infrastructure Financing to Lifecycle Funding Requirements – Capital & Operating (millions, 2020$)

Introduction

1 Introduction

1.1 THE ASSET MANAGEMENT CONTEXT IN THE TOWN OF MILTON

In 2000, the Town of Milton set out on a path of growth that saw a small Town of 32,500 residents evolve into a dynamic, modern and innovative community of approximately 125,000 residents today. Growth is expected to continue at a rapid pace with the population anticipated to reach 235,000 by 2031 based on the Region of Halton's best planning estimates. The Town currently owns over $2 billion worth of transportation and stormwater tangible capital assets based on current replacement values, much of which is relatively new given the rapid growth of the community.

1.2 WHAT IS AN ASSET MANAGEMENT PLAN?

The Federation of Canadian Municipalities (FCM) has defined an Asset Management Plan as, "a plan development for the management of one or more infrastructure assets that combines multidisciplinary management techniques (including technical and financial) over the life cycle of the asset in the most cost-effective manner to provide a specified level of service".

A significant component of the plan is a long-term cash flow projection for the activities because making decisions about maintaining, replacing and repairing municipal infrastructure are complex. For example, these decisions must weigh community budgetary needs against critical services such as roads, bridges, and stormwater systems.

Part of this complexity is why asset management isn't about doing one thing – it is about building a robust understanding of asset needs and implementing good practices that care for community infrastructure assets. For these reasons, this plan will help support the Town's development of skills and practices in the following competency areas:

- Policy and governance to lead organizational alignment and commitment.
- People and leadership to create and sustain connections across teams.
- Data and information that you need about your assets when you need it.
- Planning and decision-making to ensure policies, objectives and information to consistently inform the organization.
- Contributions to asset management practices to support continuous improvement and ensure internal stakeholders are well-informed, especially when communicating and participating in external knowledge sharing.

1.3 PURPOSE OF THIS ASSET MANAGEMENT PLAN

This Asset Management Plan will provide guidance to ensure the Town's community infrastructure systems continue to support the lifestyles of its residents who have chosen Milton because of its beautiful natural setting, rural hamlets, proximity to a broad employment market, safe and attractive

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neighborhoods, excellent services and strong civic pride. This is a long-range planning document that can be used to continually improve asset activities for public services and provides a guide for understanding:

- The Town's organizational strategic goals.
- The specific asset portfolios included, on a Town-wide scale.
- The Town's levels of service and performance standards.
- Demand forecasts from a system perspective.
- Data to support long-term funding decisions to prolong asset life.
- The lifecycle activities that operate, maintain, renew, and dispose of assets and their cashflow forecasts.
- Key actions to improve asset management practices.

1.4 ASSETS INCLUDED IN THIS ASSET MANAGEMENT PLAN

This Asset Management Plan covers both the Town's Transportation System and its Stormwater System. The asset types for each is illustrated below in a parent-child relationship called the asset hierarchy. Using an asset hierarchy helps the Town organize and manage its library of asset information to support decision-making. The subsequent chapters in this plan will provide information with the same structure that is detailed in **Table 1** below.

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Program Area	Asset Type	Asset
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		Bridges & Culverts
		Sidewalks
		Guard Rails
		Walkways/Trails
		Gateway Features
		Retaining Walls
	Traffic	**Streetlights**
		Traffic Signs
		Traffic Signals
Stormwater System	**Stormwater Network**	**Stormsewers**
		Manholes & Catchbasins
	Stormwater Management Facilities	**Storm Ponds**
		Oil/Grit Separators

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1.5 THE TOWN'S VISION AND MISSION

To make a positive impact and drive change, the Town's Council and senior management generated the following vision and mission. This Asset Management Plan intends to support the Town's Council and senior management along this journey. Further detail about how that happens is included in the following sections of this chapter.

The Town's Council and senior management are committed to building a complete community - one that is healthy and safe, enhances transportation and mobility, promotes innovation, education and health, ensures adequate funding to support infrastructure development, and focuses on long term financial stability. This Asset Management Plan intends to support the Town's Council and senior management's goal of being a complete community and a Place of Possibility. Further detail about how that happens is included in the following sections of this chapter.

1.6 GOVERNANCE AND CONTROL

The Town's Corporate Asset Management Plan (AMP) is designed to enable Asset Management (AM) practices that achieve the Town's vision and support its mission. These practices are the expression and outcome of the Town's AM Program. The mandate for the AM Program is provided by the Town's Strategic Plan and directed by the Town's Strategic AM Policy. Control is achieved through ongoing Strategic Asset Management Oversight and continuous improvement of the Corporate AM Plan. These relationships are illustrated below in Figure 1:

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Figure 1: The Town's Governance Framework for the 2020 Corporate AM Plan

1.7 THE TOWN'S GUIDING PRINCIPLES FOR ASSET MANAGEMENT

The Town's Strategic Asset Management Policy incorporates principles and objectives from *The Infrastructure for Jobs and Prosperity Act, 2015* for managing infrastructure assets. The following guiding principles are from the Town's AM Policy and are included to ensure a universal understanding about what is of fundamental importance to the Town in the management of its infrastructure systems:

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- **Forward Looking -** The Town shall take a long-term view while considering demographic and economic trends in the region. The Town will incorporate social, legislative, environmental and financial considerations into decisions to adequately address present and future land use planning, customer service commitments, environmental stewardship and regulatory requirements.
- **Budgeting and Planning** – The Town shall take into account any applicable budgets or fiscal plans, such as fiscal plans released under the Fiscal Transparency and Accountability Act, 2004 and Budgets adopted under Part VII of the Municipal Act, 2001.
- **Prioritizing** – The Town shall clearly identify infrastructure priorities in order to better inform investment decisions
- **Consistency** – The Town shall ensure the continued provision of core public services.
- **Economic Development** – The Town shall promote economic competitiveness, productivity, job creation and training opportunities.
- **Transparency** – The Town shall be evidence based and transparent. Investment decisions with respect to infrastructure will be based on information that is either publicly available or is made available to the public.
- **Customer Focused** – The Town shall develop clearly defined levels of service and adhere to optimal asset management processes and practices, including investment, that are supported by continually updated asset data and performance measures.
- **Risk-based** – The Town shall direct resources, expenditures, and priorities in a way that achieves the established levels of service, once developed and as may be amended, at an acceptable level of risk, recognizing that public safety is the priority.
- **Integration** – The Town shall evaluate assets in terms of their role and value within the context of the municipality as a whole, as opposed to examining individual assets in isolation.
- **Risk Management of Public Safety** – The Town shall ensure that the health and safety of workers involved in the construction and maintenance of infrastructure assets is protected.
- **Environmentally Conscious** – The Town shall minimize the impact of infrastructure on the environment by respecting and helping to maintain ecological and biological diversity and augmenting resilience to the effects of climate change.
- **Financial sustainability** – The Town shall choose practices, interventions and operations that aim at reducing the lifecycle cost of asset ownership, while satisfying agreed levels of service. Decisions are based on balancing service levels, risks and costs.
- **Innovation** – The Town shall continually improve the asset management approach as new tools, techniques and solutions are developed.

1.8 CORPORATE AM PLAN EVALUATION

Finally, the Corporate AM Plan will be evaluated to assess its effectiveness with a variety of tools, technologies, processes, and reports. While the Province of Ontario's regulation *Asset Management Planning for Municipal Infrastructure, 2017* defines timelines for reporting to Council, this section includes key projects from the Town's AM Program that provide outputs on an ongoing basis to foster continuous improvement of the Corporate AM Plan:

- Condition assessments for infrastructure assets will continue to be planned for and coordinated. Assets without condition assessment information are identified in the final chapter of this plan as part of a comprehensive data collection program. These activities, done effectively, will ensure adequate level of service is maintained and serve as an avenue to assess efficiency.
- Performance measurement programs for infrastructure assets will collect information to support the Town's financial management. Proper stewardship of these activities will provide assurance that the Town is continually improving its service delivery models despite the pressures

of growth. Key areas that the Town is stewarding for its various infrastructure services are included in the Town's Long-Term Fiscal Impact Assessment of Growth. These include non-residential growth, supporting mixed-use growth in employment areas, reviewing service levels, managing the pace of residential growth and capital investment, and reviewing the service delivery models for public services as the Town continues to develop partnerships with other levels of government and the private sector.

- Risk assessments and related risk management studies including climate change and extreme weather events will confirm that risks are effectively quantified and mitigated.
- Excellence in financial management will support tracking of total spending and unplanned spending for each program on an annual basis. These evaluation activities will be used to confirm that the Asset Management Plan is both delivered and effective because its implementation is intended to reduce unplanned spending over several years. The Town's capabilities in this area were recognized at an international level with the Canadian Award for Financial Reporting by the Government Finance Officers Association of the United States and Canada (GFOA) for its Annual Financial Report in 2017. In addition, the Town has also received a Distinguished Budget Presentation Award from the GFOA consecutively from 2006 to 2019.
- Finally, benchmarking the maturity of asset management functions will provide the Town will an opportunity to understand its progression as it addresses areas for improvement. This may also enable comparisons to other municipalities.

1.9 HOW ASSET MANAGEMENT SUPPORTS THE TOWN'S STRATEGIC GOALS

The Town of Milton's Council Staff Work Plan established in 2020 represents the Town's Strategic Plan for the remainder of this term of Council. It sets out a clear path for realizing the shared vision of Council and staff to build a complete community and serves as the building blocks for achieving a Place of Possibility. The established priorities build a road map for the remainder of this term of Council but are intended to impact Milton for generations. A key component of achieving this vision is to ensure that the best possible decisions are being made regarding Milton's' infrastructure assets. Table 2 outlines the core objectives of the Town's Council Staff Work Plan and identifies how they are supported by the Asset Management Plan. To maintain alignment, these actions and objectives will continue to be updated in the next version of the Town's AM Plan.

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Table 2: Alignment of the Town's Strategic Themes, Goals and Asset Management Objectives

Strategic Theme	Strategic Goals	AM Objectives
Planning for Growth.	We will plan and build our community to accommodate growth while managing new service and infrastructure demands and balancing taxpayer affordability.	• Maintain compliance with O.Reg 588/17. • Ensure municipal infrastructure remains in a state of good repair by continually improving and implementing the Asset Management Plan. • Apply condition assessment techniques across existing assets to ensure areas planned for intensification and growth meet level of service expectations. • Continue to refine lifecycle models to determine the change in asset performance metrics over time with current lifecycle strategies for the rehabilitation and replacement of municipal assets. • Continue to integrate the anticipated growth in new assets into the Asset Management Plan with full lifecycle strategies and costs from creation through to renewal. • Measure changes to transportation congestion and demand patterns as the Town continues to grow and as new transportation options are provided that reduce driving and mitigate demands on municipal infrastructure.
Increasing Revenue Potential.	We will achieve sustainable new revenue streams.	• Continue to leverage the Asset management Plan to inform the funding needed to acquire, operate, maintain, and renew the Town's infrastructure assets. • Proactively identify funding gaps and implications for economic development activities and how to prioritize the maintenance needs for the existing asset base. • Drive collective input and continually improve the asset valuation process to ensure user fees and service subsidies are competitive and affordable. • Inform the Town's needs for new funding requirements with shared asset information gathering and generation.

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Strategic Theme	Strategic Goals	AM Objectives
Community Attractiveness and Competitiveness.	We will improve Milton's attractiveness for prospective talent and investment.	• Develop Asset Management Plans for Transit, Facilities, Parks, and Trails. • Review the range of existing services and service levels to test for equality, equity, and the extent to which they meet the needs of the Town's diverse community with professionals and youth.
Service Innovation.	We will deliver services that address increased expectations and service requests and manage the need for new investment.	• Explore modern technology platforms and processes for effective asset management and workforce planning to ensure that maintenance and operational activities can be carried out for assets according to their optimal schedule. A lack of sufficient resources can often lead to a backlog of maintenance activities. • The Asset Management Program helps drive public input from residents and businesses on their service priorities. • Leverage the Asset Management Plan to build and enhance data and information to assist Council and staff in evidence-based decision making.

1.10 PROVINCIAL ASSET MANAGEMENT PLANNING REQUIREMENTS

The Town of Milton's AM journey began in 2007 when the Public Sector Accounting Board (PSAB) 3150 established new requirements for municipalities to practice Tangible Capital Asset (TCA) accounting. This new accounting process resulted in the development of the first comprehensive inventory of all assets owned by the Town.

In 2012, the Province published 'Building Together: Guide for Municipal Asset Management Plans' to encourage and support municipalities in Ontario to develop AMPs in a consistent manner. The guide describes a general approach to structing AMPs and provides insight into the content that should be included in sections related to the State of Local Infrastructure, Levels of Service, Asset Lifecycle Management Strategies, and Financing Strategies.

Building Together outlines the information and analysis that municipal asset management plans are to include and was designed to provide consistency across the province for asset management. To encourage the development of AMPs, the Provincial and Federal governments also made an AMP a prerequisite to accessing capital funding grants.

Introduction

In 2015, Ontario passed an Infrastructure for Jobs and Prosperity Act which affirmed the role that municipal infrastructure systems play in supporting the vitality of local economies. After a year-long industry review process, the Province created Ontario Regulation 588/17 – Asset Management Planning for Municipal Infrastructure as the first regulation made under the Infrastructure for Jobs and Prosperity Act. O.Reg 588/17 that further expands on the Building together guide, mandating specific requirements for municipal AM Policies and AM Plans, phased over a five-phased period. The following points summarize the general requirements and timelines of O.Reg. 588/17:

July 1, 2019

- The Town requires an AM policy that articulates specific principles and commitments that will guide decisions around when, why and how money is spent on infrastructure systems.

July 1, 2021

- The Town requires an AMP that documents the current levels of service being provided and the costs to sustain them for the Town's stormwater, roads and bridges infrastructure systems (i.e. 'core' assets per O.Reg. 588/17).

July 1, 2023

- The Town requires an AMP that documents the current levels of service being provided and costs to sustain them for all infrastructure systems in the Town.

July 1, 2024

- The Town requires an AMP that documents the current levels of service being provided, the costs to sustain the current levels of service, the desired levels of service, the costs to achieve the desired levels of service, and the financial strategy to fund the expenditures necessary to achieve the desired levels of service for all infrastructure systems in the Town.

Figure 2: Regulatory Requirements and Timelines for Asset Management Planning (O. Reg. 588/17)

1.11 DEVELOPING THE CORPORATE ASSET MANAGEMENT PLAN

The development of this Corporate AM plan was led by the Town's Asset Management staff. Initial steps in the development of this plan included data collection, compiling data, developing an analysis tool, and meeting with various asset system working groups to discuss, review and provide feedback on each component of the Plan.

Introduction

Key outputs from the 2020 Corporate AM Plan include:

- Compliance with the O.Reg 588/17 timelines for municipal asset management planning for core assets.
- Asset inventory documentation, with gaps in cost and condition identified and filled.
- Current level of service, targets and key performance indicators (KPIs) that enable the Town to communicate the services it provides to its community, and to quantify and measure their efficiency and effectiveness in support of service-centric decision-making.
- Optimized asset lifecycle strategies to enable the prediction of asset interventions based on condition and strategic business factors such as costs, levels of service and risks. As a key outcome for the Town, the strategies, predictive models, intervention triggers, costs, and the expected improvement associated with an intervention will enable a whole-life view with supporting data.
- Funding requirements to support levels of service and the lifecycle management strategy.
- In collaboration with Town staff, a risk management strategy to enable the prioritization of capital investments. The risk strategy will provide the Town with a standardized definition of asset criticality and will particularly consider risks related to climate change. The strategy will be linked to levels of service, asset condition (likelihood of failure) and asset criticality (consequence of failure) as a tool to enable prioritization across different asset classes.
- Improvement actions for data management, resources, and technology.

As outlined in the Strategic Asset Management Policy, the 2020 Corporate AM plan will be referenced to:

- Identify all potential revenues and costs associated with forthcoming infrastructure asset decisions.
- Evaluate the validity and need of each significant new capital asset.
- Incorporate new revenue tools and alternative funding strategies where possible.

With these objectives in mind, Table 3 identifies the roles and responsibilities of the corporate stakeholders for developing, implementing and approving the Town's Corporate AM Plan.

Table 3: The Town's Corporate Asset Management Stakeholders, Roles and Responsibilities

Key Stakeholder	Roles and Responsibilities
Town Council	• Approve the Asset Management policy and Corporate Asset Management Plan. • Serve as representatives of stakeholder and community needs particularly as it relates to determining the services and service levels to be provided. • Approve funding levels for both capital and operating budgets associated with Asset Management through the annual budget. • Support ongoing efforts to continuously improve and implement the asset management plans.
Strategic Management Team	• Endorse corporate asset management plans and policy. • Participate in the process of aligning asset management strategies and plans with organizational strategies and objectives.

Introduction

Key Stakeholder	Roles and Responsibilities
	• Communicate the vision of asset management at a corporate level, encourage engagement with the processes and provide the guidance necessary to ensure alignment and integration across the organization.
Leadership Management Team	• Implement the Asset Management policy. • Provide input on needs of department, current status of assets, and current levels of service • Support and comply with data collection requirements. • Participate in the development of the corporate asset management work plans pertaining to their areas of expertise. • Participate in the regular review of all documentation, data, and asset measurement tools to ensure continued relevance and applicability of existing policies and practices. • Document the alignment of Asset Management Plans with the priorities established and projects requested through the budget process.
Chief Financial Officer & Treasurer	• Ensure alignment between the Town's asset management financing plan to the Town's long-term financial plan.
Staff involved in delivering the Town's Asset Management Program	• Ensure Town maintains compliance with the regulation. • Lead the development of asset management policy, strategy and confirm the implementation plan/resource requirements. • Coordinate the development of asset management plans. • Provide corporate support for asset management. • Establish practices that ensure uniformity of approach across the organization. • Encourage information sharing and collaboration across departments. • Provide input and direction to corporate asset management work plans to ensure consistency with other initiatives. • Lead the development of asset inventories, condition assessments, risk assessments and related asset management initiatives in line with industry best practices.

1.12 CONTINUALLY IMPROVING THE TOWN'S AM PROGRAM

Moving forward, the Corporate AM plan is intended to be a living document that reflects the Town's Strategic Plan and supports implementation of the Town's Strategic AM Policy. As a living document, continuous improvement will be driven by:

- Implementing, revising, refining and reporting on the Town's Official Plan and Corporate Strategic Plan.
- Outputs from key projects from the Town's AM Program defined in Section 1.8 Corporate AM Plan Evaluation.

Introduction

- Continual cross-functional collaboration towards identifying AM improvements in processes, systems, data, AM Plans, and AM Plan implementation tactics.
- Monitoring progress on the AM Plan implementation while quantifying and reporting benefits from AM Program activities.

Best practices to achieve continuous improvement include the development of an improvement plan, and delivering the improvement plan with defined annual targets, appropriate benchmarks, and responsibilities for internal resources with their associated funding levels, as approved by the Town's annual budgeting process. Best practices from the International Infrastructure Management Manual (IIMM) are included below in Table 4 with associated timelines.

Table 4: Continuous Improvement of the AM Program

Timeline	Best Practices Activities (IIMM)
Year 1	• Determine and communicate strategic priorities for the organization, criteria for success, and goals. • Assess AM performance against the criteria for success for each goal, priority, or theme. • Identify AM improvements, appropriate benchmarks, and responsibilities for internal resources. • Develop, review, and approve an AM Improvement Plan.
Year 2	• Deliver AM Improvement Plan. • Monitor outcomes from the AM Improvement Plan. • Quantify and report progress on the AM Improvement Plan and other AM Program activities.
Year 3	• Deliver AM Improvement Plan. • Monitor outcomes from the AM Improvement Plan. • Quantify and report benefits from the AM Improvement Plan and other AM Program activities.

The continuous improvement of the Town's AM plan is supported by a broader system of governance that is developed in various forms for guiding the management of community infrastructure systems. These plans are designed to review and align with the business needs of the Town's citizens. Many of these are included in Ontario's AM Regulation.

Table 5: Timeframes and Update Frequency of Asset Management Planning Documents

Asset Management Planning Document	Timing	Targeted Benefits
Asset Management Governance Structure	2019 (Complete)	• Facilitates knowledge sharing and coordinates of improvement activities. • Defines roles and responsibilities. • Promotes collaboration.

Introduction

Asset Management Planning Document	Timing	Targeted Benefits
Asset Management Policy	2019 (Complete)	• Broadly outlines the principles and requirements for undertaking asset management across the organization in a structured and coordinated way, consistent with the organization's strategic plan. • Clarifies the vision, mission and objectives for Asset Management. • Increases awareness, priority and leadership for Asset Management.
Asset Hierarchy and Register for the 2020 AMP	2020 (completed for all core assets in the transportation and stormwater systems that are included in the 2020 AMP)	• Provides a robust database for enabling a data drive approach for asset management planning functions. • Increases utility in recommendations to support decision making. • Facilitates data sharing between departments and service areas. • Improves planning of budgets with higher quality historical data and analysis capabilities.
Corporate Asset Management Plan	2021 (core assets) 2023 (remaining assets)	• Clarifies the vision for Asset Management. • Provides a mandate for Town staff with direction for targeted and cost-effective investments in community infrastructure systems. • Informs discussions with Council regarding the impact to levels of service from policy priorities, strategic initiatives, and capital and operational budgets. • Defines a service oriented, long-term financial forecast with a supporting business case. • Secures commitment to long-term planning for infrastructure systems • Defines opportunities for improvement in Asset Management.
Asset Management Policy Update	2024	• Facilitates the development of new guiding principles and affirms the relevance of current guiding principles for the Town's Asset Management Program. • Incorporates new best practices, strategic documents, or regulatory changes.
Asset Condition Assessments	Ongoing	• Identifies frequencies to better understand assets and levels of service. • Enables clear analysis of current condition of assets, which directly feeds into informed decision-making. • Assists in allocating funding to the most critical assets and assists in risk management.
Asset Full Lifecycle Costing Models	Ongoing	• Quantification of full project lifecycle costs, based on assumed unit rates for use in options analysis.

Introduction

Asset Management Planning Document	Timing	Targeted Benefits
Asset Management Performance Reporting	Annual	• Ensuring trends are measured for asset management functions. • Tools, techniques and KPIs to report annual progress and opportunities. • Cost benefit analysis of level of asset management sophistication.
Capital and Operational Budgets	Annual	• Allocates funding for Asset Management improvement initiatives including condition assessments, lifecycle costing models, performance measurement, and business-oriented technologies including information systems development. • Allocates funding for implementing the Asset Management Plans.
Corporate Asset Management Plan Update	At least every five (5) years	• Incorporates outputs from Asset Management improvement initiatives. • Maintains compliance with changing regulatory requirements.

1.13 ASSET MANAGEMENT PLAN ASSUMPTIONS AND LIMITATIONS

The following points summarize the assumptions and limitations of the 2020 Corporate AM Plan:

- This Corporate AM plan was developed based on the best available information where some assumptions using professional judgement were made to address gaps.
- Unit costs can be developed from the Town's recent tenders and meet regulatory requirements for public availability and currency.
- Continually update as project/plan progresses.

Transportation Services

2 Transportation State of Local Infrastructure

2.1 STATE OF LOCAL INFRASTRUCTURE

Transportation infrastructure is such a crucial part of daily life that it is often taken for granted. When a resident leaves their home, they use a transportation service. Good roads and structures promote business, create employment, provide social opportunities, create markets, and save lives. When transportation infrastructure is deficient, congestion escalates, the frequency of accidents increases, wear and tear on vehicles worsens, emergency response deteriorates, the environment is negatively impacted, businesses suffer, and opportunities are lost.

This chapter of the Corporate AM Plan summarizes the inventory of assets and their replacement value and provides the age and condition profiles for each type of asset in the Town's Transportation System. A summary of the data sources used in these analyses is also included for reference purposes as the Town continues to improve its information systems to support decisions that benefit its citizens.

2.2 THE TOWN'S TRANSPORTATION SYSTEM

The importance of efficient transportation is essential to building a strong economy and improving the quality of life for our citizens. The Town contributes to the local economy and quality of life by supporting the safe and efficient movement of people and goods using transportation infrastructure, while managing the growing cost of transportation.

Traffic assets are part of the Transportation System and used to support reliable, efficient, and safe transportation. The Town of Milton operates and maintains roadways, bridges and traffic infrastructure, thus enabling safe and effective travel. This chapter provides a summary of the assets included in these community infrastructure systems. The summary includes the best available information on replacement costs, age and condition profiles.

2.3 ASSET INVENTORY

This section summarizes the portfolio of infrastructure assets associated with the various public services managed by the Town of Milton. The associated performance requirements and specific thresholds that trigger investments like rehabilitation and replacement are described in the Levels of Service chapter and the Asset Lifecycle Management Strategy chapter. The information used to develop these profiles is described at the end of the chapter.

Roads and Structure assets can be broken up into the Road network, bridges and culverts, and other right of way (ROW) assets including sidewalks, guard rails, gateway features, walkways/ trails, and retaining walls. The Town of Milton also owns and operates a large quantity of traffic safety systems including streetlights, traffic signs and traffic signals. It should be noted that this inventory includes only assets owned by the Town which does not include any assets not yet assumed from developers. Replacement values for each asset include contingency, design and project management costs. The total amount of each asset being managed by the Town is summarized in Table 6, below.

Table 6: The Town of Milton's Transportation Services Asset Inventory

Program Area	Asset Type	Asset		Count	Unit	Replacement Value (2020$)
Transportation Services	Roads & ROW	Road Network	Rural	273.9	centreline	$415.3M
			Urban	346.9	centreline	$952.5M
		Road Network Subtotal		620.9	centreline	$1,367.8M
		Sidewalks		277,447	m	$35.6M
		Guard Rails		14,097	m	$2.0M
		Gateway Features		5	each	$0.5M
		Walkways/Trails		131,187	m	$11.1M
		Retaining Walls		11	each	$2.0M
		Other Right of Way Assets Subtotal				$51.2M
		Roads & ROW Subtotal				$1,419M
	Structures	Bridges		54	each	$60.6M
		Culverts		50	each	$33.2M
		Structures Subtotal		104	each	$93.8M
	Traffic	Streetlights		8,931	each	$49.2M
		Traffic Signs		15,591	each	$1.2M
		Traffic Signals		137	each	$9.8M
		Traffic Subtotal		16,444	each	$60.2M
Total Portfolio						**$1,573M**

(minor differences due to rounding)

2.4 ASSET VALUATION

Transportation is a very significant aspect of human life. In order to move people, goods, and services from point A to point B, transportation assets must address several needs. This section summarizes the estimated replacement value of the infrastructure that the Town manages to support the provision of accessible, safe and reliable Transportation Services.

The Town of Milton's portfolio of infrastructure assets for Transportation Services is valued at $1,573 million, which includes the value of the assets and an additional 25% to cover contingency/design/etc. This breaks down into the roads and other ROW assets portfolio with a value of $1,419 million, structures portfolio with a total value of $94 million and traffic portfolio valued at $60.2 million. These details are summarized along with their aggregated condition grades weighted by replacement value for each group in Table 7 below. The overall average condition score (weighted by replacement value) for Transportation assets is 76. Details regarding specific condition values and supporting information sources is described in the proceeding sections.

Table 7: Asset Valuations for the Transportation System (2020$, millions)

	Road & ROW 	Structures 	Traffic 
Total Replacement Value	$ 1,419	$ 94	$ 60.2
Average Condition Score	77	71	60

2.5 ASSET CONDITION

Condition scores have been estimated for all Transportation assets based on the best available data and converted to a 1-100 scale (100 being very good condition) for ease of comparison. Based on the year the condition information was collected, the condition was degraded to provide an estimate of current condition. Where inspection data is unavailable, condition was estimated based on the age of the asset and its estimated service life. Unless otherwise noted, the condition values used within the AMP are these converted and degraded scores.

The condition score can then be categorized into five rating categories ranging from very good to very poor. Condition ratings were provided for every asset using the condition scale system as seen in Table 8 below. The rating scale is consistent with the Canadian Infrastructure Report Card (2016) to facilitate benchmarking between other Canadian municipalities and allows for comparisons between asset classes. However, both roads and bridges/culverts have condition categories which have been used in previous reporting. To allow for comparison to previous reporting, numbers/graphics within this report for individual asset classes will use their specific categorization, while anything that compares between asset classes will use the standardized condition categories. Regardless of which category system is used, the condition score of an asset remains the same and is either derived from condition data or their remaining estimated service life.

Table 8: Condition Rating Scale for the Transportation System Assets

Value	Category	Condition Score	Bridge/Culverts BCI	Roads PCI	Description
1	Very Good	80 - 100	90 - 100	86 - 100	The infrastructure in the system or network is generally in very good condition, typically new or recently rehabilitated. A few elements show general signs of deterioration that require attention.
2	Good	60 - 79	65 - 89		The infrastructure in the system or network is in good condition, some elements show general signs of deterioration that require attention. A few elements exhibit significant deficiencies.
3	Fair	40 - 59	50 - 64	76 - 85	The infrastructure in the system or network is in fair condition, it shows general signs of deterioration and requires attention. Some elements exhibit significant deficiencies
4	Poor	20 - 39	40 - 49	56 - 75	The infrastructure in the system or network is in poor condition and mostly below standard, with many elements approaching the end of their service life. A large portion of the system exhibits significant deterioration.
5	Very Poor	0 - 19	<40	1 - 55	The infrastructure in the system or network is in unacceptable condition with widespread signs of advanced deterioration. Many components in the system exhibit signs of imminent failure, which is affecting service.

Table 9: Asset Condition Details: Transportation System, All Assets

Replacement Value:	$1,573 million	Data Confidence Grade:	Moderate: further details provided by asset

Summary:

At the service level, the Town's Transportation System is described in Figure 3 terms of its overall estimated replacement costs, in current-year dollars. The most significant assets in terms of replacement value is the road network, valued at $1,367million. Bridges and culverts are the second most significant assets in terms of replacement value, at approximately $94 million. The current lifecycle stage for each asset category is illustrated in Figure 4, weighted by replacement value.

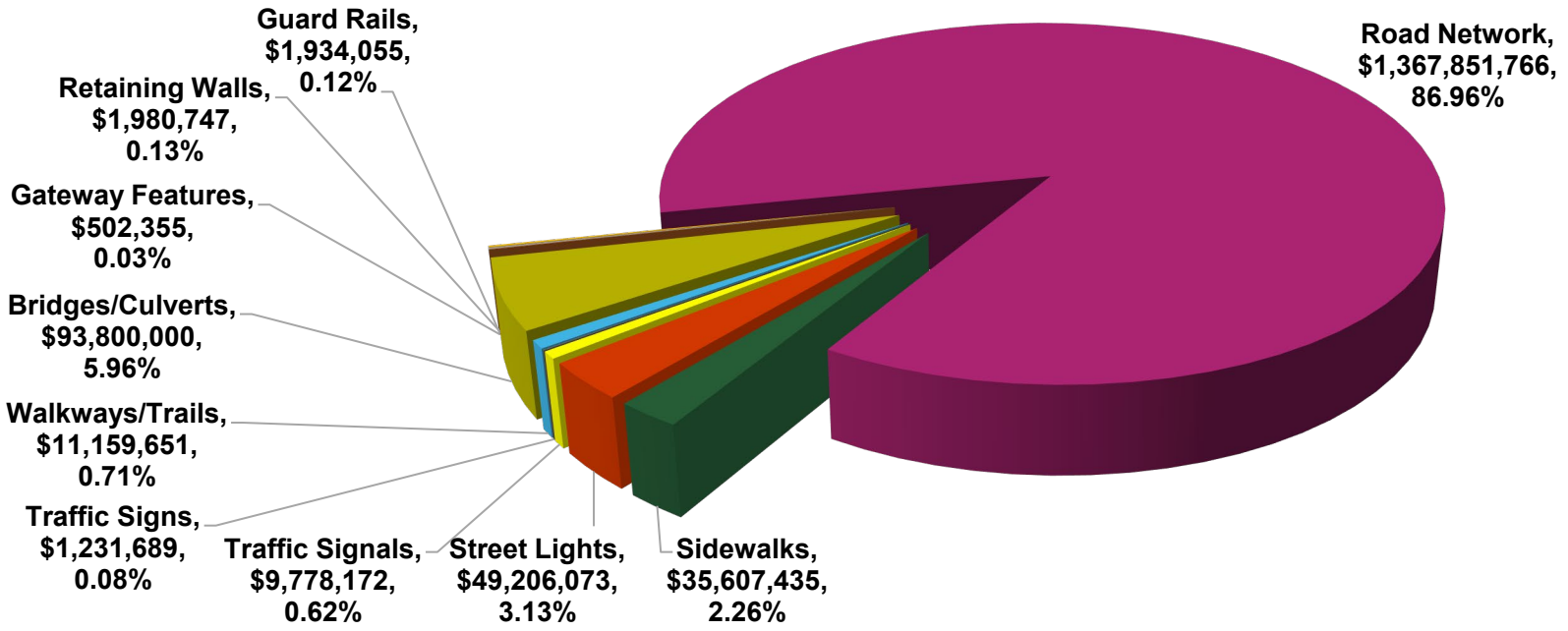


Figure 3: Asset Replacement Value for all Asset Types in the Transportation System

Transportation State of Local Infrastructure

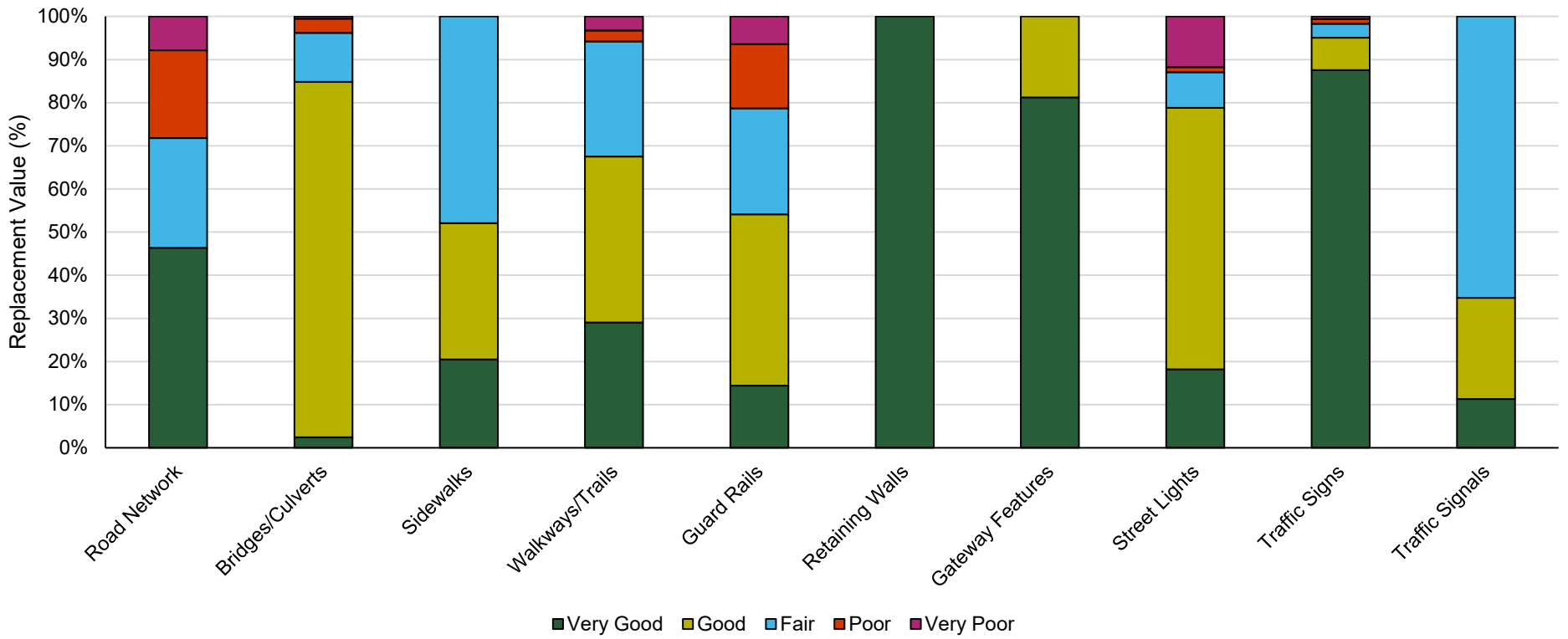


Figure 4: Transportation System: Condition Score by Replacement Value

Table 10: Asset Condition Details: Road Network

Replacement Value:	$1,367 million	Data Confidence Grade:	High: reliable sources, no assumptions required
Average Age:	8 Years	Estimated Service Life:	75 Years
Asset Count:			
Rural Roads		273.9 centreline km	
Urban Roads		346.9 centreline km	
Total:		620.9 centreline km	

Summary:

Figure 5 below describes the Town's road network and the proportion of the replacement value that falls into each road specific condition category. The replacement value for the Town's road network is $1,367M. Approximately 46% of the Town's road network is in good or very good condition, with another 26% of the network in fair condition. Approximately 20% and 8% respectively of the road network is in poor and very poor condition each. These numbers reflect the condition of roads based on a 2018 road needs study, degraded to estimated current day conditions. The age of the assets was also estimated based on this visual assessment of road condition, resulting in an underestimation of the road network's age.

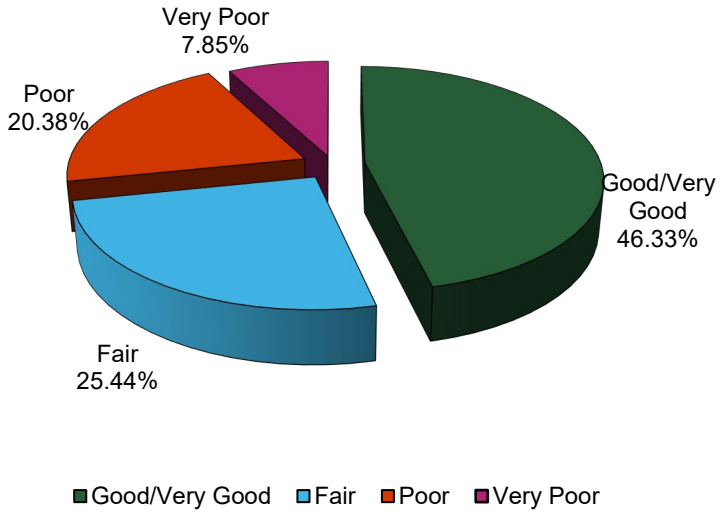


Figure 5: Asset Condition: Road Network

Table 11: Asset Condition Details: Bridges & Culverts

Replacement Value:	$93.8 million	Data Confidence Grade:	High: reliable sources, no assumptions required
Average Age:	42.12 Years	Estimated Service Life:	50 or 75 Years
Asset Count:			
Bridges		54 each	
Culverts		50 each	
Total:		104 each	

Summary:

Figure 6 describe the Town's bridges and culverts inventory and the proportion of the replacement value that falls into each condition category. The replacement value for the Town's bridges and culverts is approximately $93.8M. Approximately 82% of the replacement value of the Town's Bridges and Culverts inventory are in good or very good condition with 10% and 4% in fair and poor condition, respectively, while 2% are in very poor condition. These results are based on regulated inspection data collected in 2019 and degraded to estimated current day conditions.

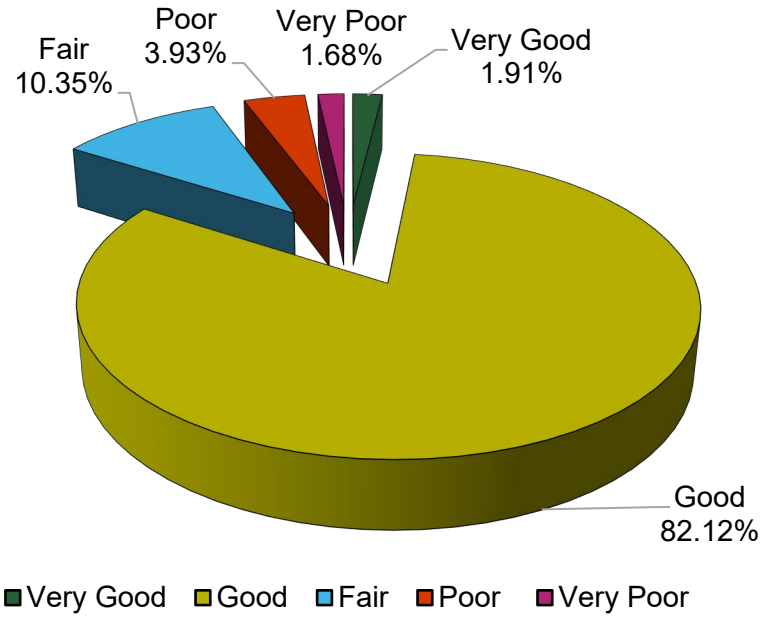


Figure 6: Asset Condition: Bridges & Culverts

Table 12: Asset Condition Details: Sidewalks

Replacement Value:	$35.6 million	Data Confidence Grade:	Moderate: reliable sources, condition based on age
Average Age:	10.33 Years	Estimated Service Life:	30 Years
Asset Count:		277,447 m	

Summary:

Figure 7 below describes the Town's sidewalk inventory and the proportion of the replacement value that falls into each condition category. The replacement value for the Town's sidewalks is approximately $35.6M. 52% of the replacement value of the Town's sidewalks are in very good or good condition, with the remaining 48% in fair condition based on the age of the assets. The condition rating was estimated using a straight-line age-based method, it is only for estimation and may not reflect the real world condition of the assets. The Town performs inspections periodically to ensure assets are in working condition and would immediately address assets that are creating a public safety risk. In-depth condition assessments would be part of the Town's improvement plan for asset management.

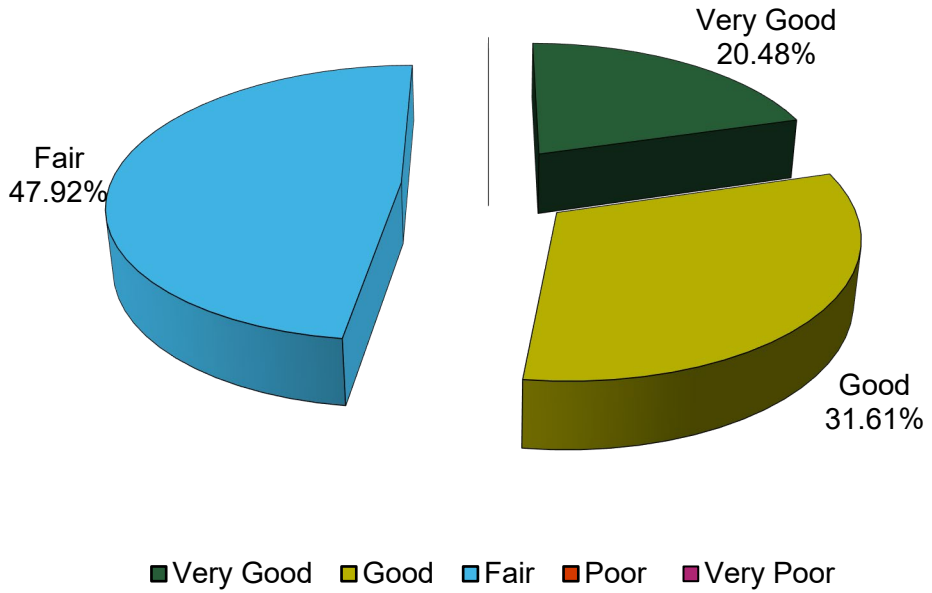


Figure 7: Asset Condition: Sidewalks

Table 13: Asset Condition Details: Walkways & Trails

Replacement Value:	$11.1 million	Data Confidence Grade:	Moderate: reliable sources, condition based on age
Average Age:	10.94 Years	Estimated Service Life:	30 Years
Asset Count:		131,187 m	

Summary:

Figure 8 below displays the Town's walkways and trails inventory and the proportion of the replacement value that falls into each condition category. The replacement value for the Town's walkways and trails is approximately $11.1M. The majority of the Town's walkways and trails are in very good or good condition, at 29% and 38% respectively. Approximately 27% of walkways and trails are in fair condition with another 3% and 3% estimated to be approaching end of life in poor and very poor condition, respectively. The condition rating was estimated using a straight-line age-based method, it is only for estimation and may not reflect the real world condition of the assets. The Town performs inspections periodically to ensure assets are in working condition and would immediately address assets that are creating a public safety risk. In-depth condition assessments would be part of the Town's improvement plan for asset management.

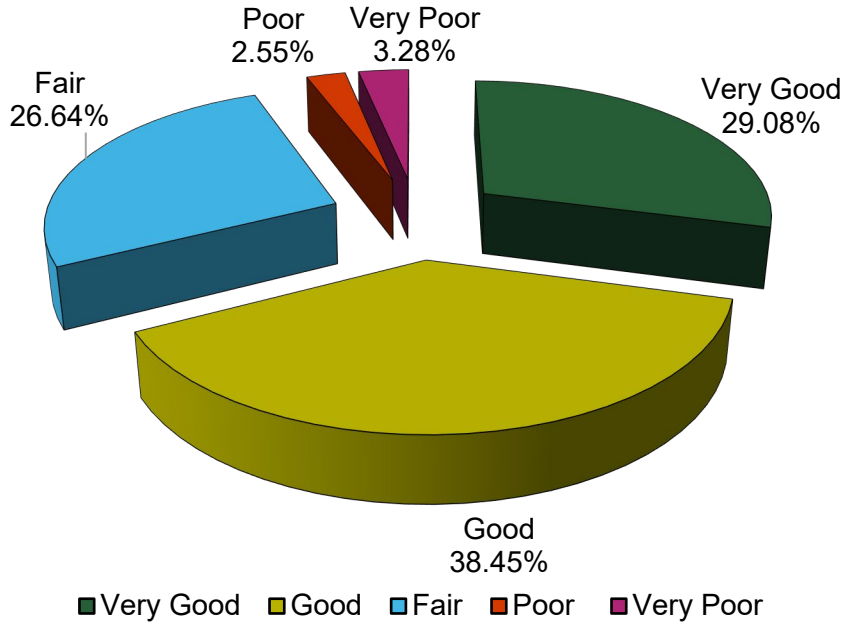


Figure 8: Asset Condition: Walkways & Trails

Table 14: Asset Condition Details: Guardrails

Replacement Value:	$2.0 million	Data Confidence Grade:	Moderate: reliable sources, some assumptions required
Average Age:	44 Years	Estimated Service Life:	50 Years
Asset Count:		14,097 m	

Summary:

Figure 9 below displays the Town's guardrail inventory and the proportion of the replacement value that falls into each condition category. The replacement value for the Town's guardrails is approximately $2.0M. The majority of the Town's guardrails, or 54% of the inventory, are in very good or good condition. Approximately 25% of guardrails are in fair condition with another 15% and 6% estimated to be approaching end of life in poor and very poor condition respectively, based on 2020 inspection data degraded to estimated current conditions.

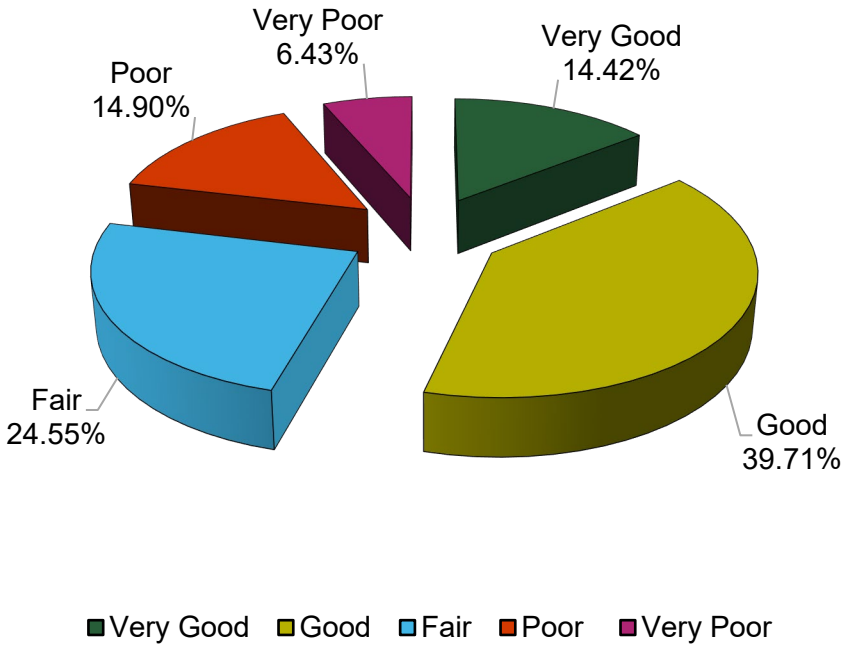


Figure 9: Asset Condition: Guardrails

Table 15: Asset Condition Details: Retaining Walls

Replacement Value:	$2.0 million	Data Confidence Grade:	Moderate: reliable sources, condition based on age
Average Age:	5.18 Years	Estimated Service Life:	50 Years
Asset Count:		11 each	

Summary:

Figure 10 describes the Town's retaining wall inventory and the proportion of the replacement value that falls into each condition category. All the retaining walls asset inventory is in very good condition. The condition rating was estimated using a straight-line age-based method, it is only for estimation and may not reflect the real world condition of the assets. The Town performs inspections periodically to ensure assets are in working condition and would immediately address assets that are creating a public safety risk. In-depth condition assessments would be part of the Town's improvement plan for asset management.

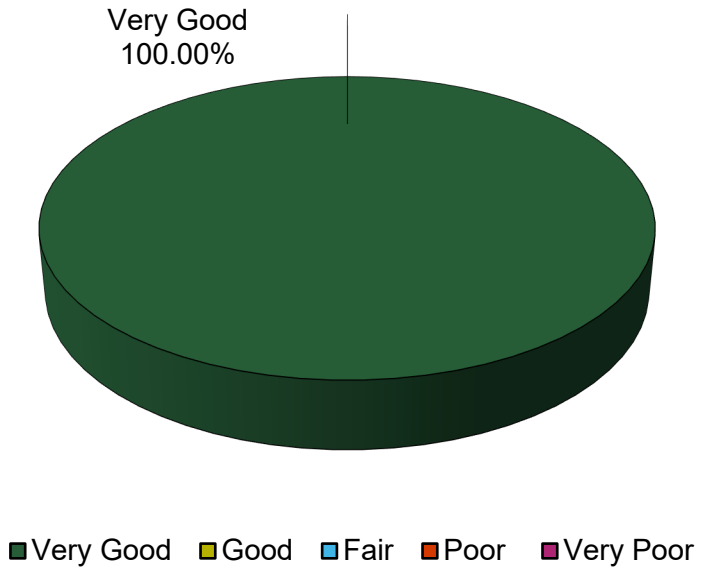


Figure 10: Asset Condition: Retaining Walls

Table 16: Asset Condition Details: Gateway Features

Replacement Value:	$0.5M	Data Confidence Grade:	Moderate: reliable sources, condition based on age
Average Age:	10.8 Years	Estimated Service Life:	50 Years
Asset Count:		5 each	

Summary:

Figure 11 describes the Town's gateway feature inventory and the proportion of the replacement value that falls into each condition category. The replacement value for the Town's gateway features is approximately $0.5M. The majority of the Town's gateway features, or 81% of the inventory, are in very good condition and the remaining 19% in good condition. The condition rating was estimated using a straight-line age-based method, it is only for estimation and may not reflect the real-world condition of the assets. The Town performs inspections periodically to ensure assets are in working condition and would immediately address assets that are creating a public safety risk. In-depth condition assessments would be part of the Town's improvement plan for asset management. These results are due to the expected life being 50 years and most installations being recent with the development of new communities.

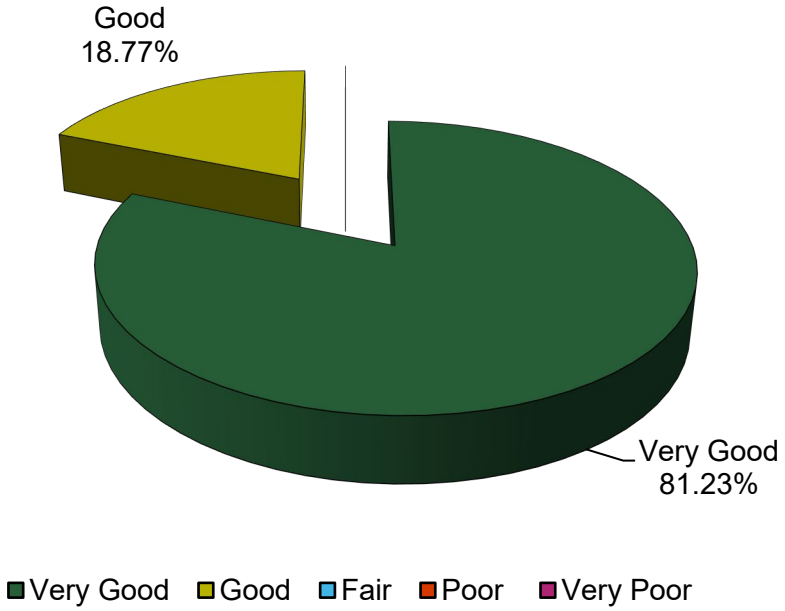


Figure 11: Asset Condition: Gateway Features

Table 17: Asset Condition Details: Streetlights

Replacement Value:	$49.2 million	Data Confidence Grade:	Moderate: reliable sources, some assumptions required
Average Age:	19.9 Years	Estimated Service Life:	50 Years
Asset Count:		8,931 each	

Summary:

Figure 12 describes the Town's inventory of streetlights and the proportion of the replacement value that falls into each condition category. The replacement value for the Town's streetlights is approximately $49.2M. Approximately 79% of the Town's streetlights are in very good or good condition. Another 8% is in fair condition with 13% of the inventory estimated to be approaching end of life and in poor condition. The condition rating was estimated using a straight-line age-based method, it is only for estimation and may not reflect the real world condition of the assets. The Town performs inspections periodically to ensure assets are in working condition and would immediately address assets that are creating a public safety risk. In-depth condition assessments would be part of the Town's improvement plan for asset management.

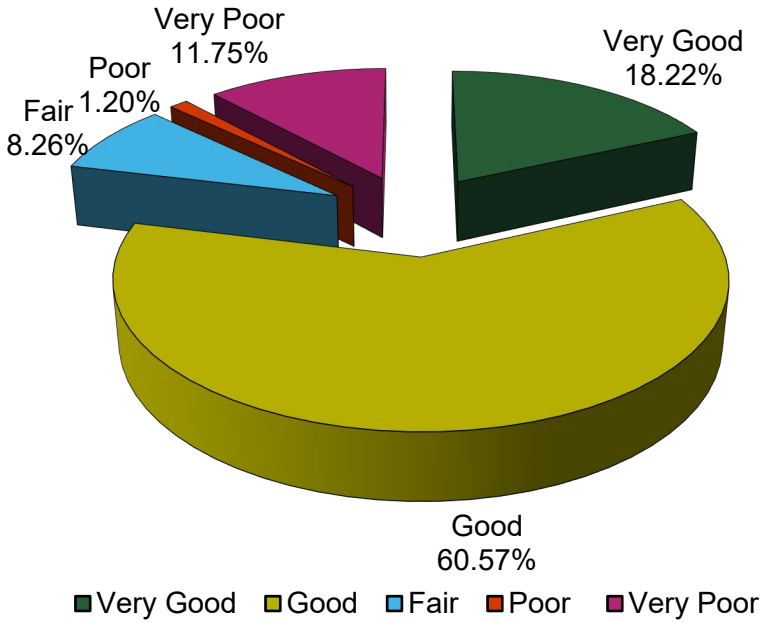


Figure 12: Asset Condition: Streetlights

Table 18: Asset Condition Details: Traffic Signs

Replacement Value:	$1.2 million	Data Confidence Grade:	Moderate: reliable sources, some assumptions required
Average Age:	5.23 Years	Estimated Service Life:	10 Years
Asset Count:		15,591 each	

Summary:

Figure 13 describes the Town's inventory of traffic signs and the proportion of the replacement value that falls into each condition category. The replacement value for the Town's traffic signs is approximately $1.2M. Approximately 88% of the traffic sign inventory is in very good condition with another 7% in good condition. Another 3% of the traffic sign inventory is in fair condition with approximately 1% and 1% in poor or very poor condition, respectively, based on 2020 inspection data.

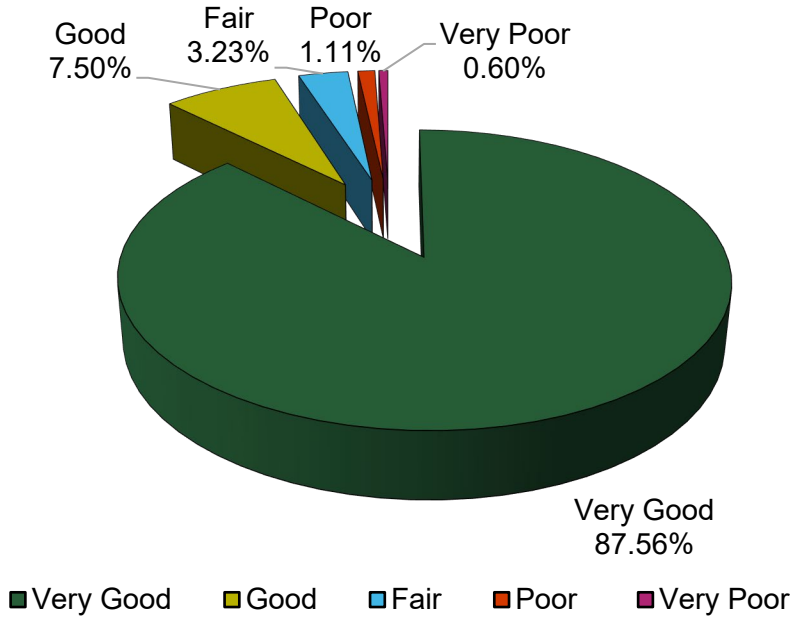


Figure 13: Asset Condition: Traffic Signs

Table 19: Asset Condition Details: Traffic Signals

Replacement Value:	$9.7 million	Data Confidence Grade:	Moderate: reliable sources, condition based on age
Average Age:	9.82 Years	Estimated Service Life:	20 Years
Asset Count:		137 each	

Summary:

Figure 14 describes the Town's traffic signal inventory and the proportion of the replacement value that falls into each condition category. The replacement value for the Town's traffic signals is approximately $9.7M. Approximately 11% of the Town's traffic signals are in very good with another 24% in good condition. The remaining 65% are in fair condition. The condition rating was estimated using a straight-line age-based method, it is only for estimation and may not reflect the real-world condition of the assets. The Town performs inspections periodically to ensure assets are in working condition and would immediately address assets that are creating a public safety risk. In-depth condition assessments would be part of the Town's improvement plan for asset management.

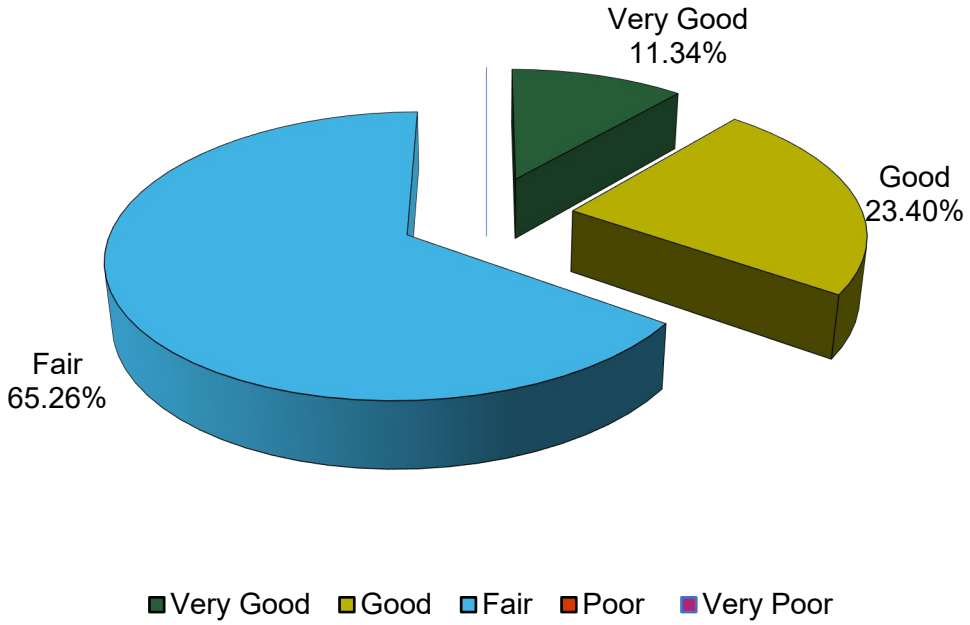


Figure 14: Asset Condition: Traffic Signals

2.6 AGE SUMMARY

Another way of visualizing the state of various asset types is to compare the average age for every asset taken altogether, against that asset type's estimated service life (ESL). While this is a general illustration with additional nuances described and illustrated in the preceding sections, Figure 15 below supports the expectation for structural assets including bridges and culverts to be the furthest along toward their expected service life. The average ages of each asset type is displayed below. It should be noted that the road network is likely underestimated due to using the condition to estimate age.

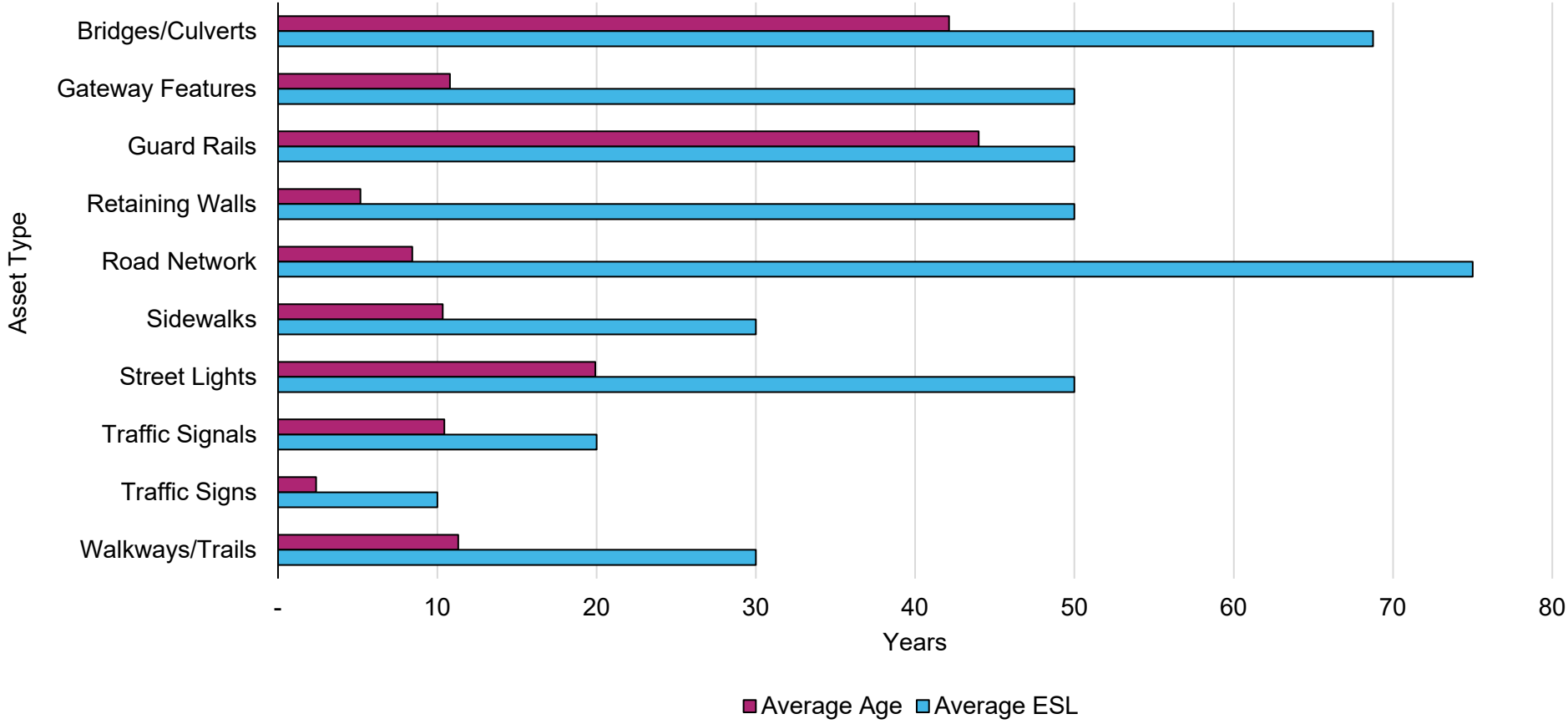


Figure 15: Average Age as a Proportion of Expected Service Life by Asset Type: Transportation Services, All Asset Types

2.7 DATA SOURCES

Table 20 outlines the data used to support the assessments of the Town's infrastructure assets. Condition data can be collected from a variety of sources. Inspections can be carried out on site to log specific defects, this type of information is typically considered the most reliable and accurate because it is typically supported by regulatory requirements. As an example, Bridges and Culverts have inspection frequencies and information requirements defined by the Ministry of Transportation in the Ontario Structure Inspection Manual (OSIM). Where condition data is unavailable, condition was estimated based on the age of the asset. The Town also continually updates its financial accounting data with generally accepted practices as defined by the Public Sector Accounting Board (PSAB). Financial data can be found online, in the Town's annual submissions to the Ministry of Municipal Affairs and Housing.

Data confidence levels are based on the reliability of data sources and the amount of assumptions required. High confidence data requires no assumptions and is from reliable sources (e.g. data from recent condition assessments that include all required fields), while low confidence data requires numerous assumptions and/or is from less reliable data sources (e.g. data that required condition to be estimated based on age). In some cases, data may have a lower confidence score even if all data is available if the data cannot be linked to the inventory or is not in a format required for the AMP analysis.

Table 20: Municipal Approach to Assessing Asset Condition with Data Confidence, Transportation Services

Program Area	Asset Type	Asset	Condition Data	Existing Asset Data	Accounting Data	Year of Record	Data Confidence
Transportation Services	Roads & Structures	Road Network	✓	✓	✓	2019	High
		Structures	✓	✓		2019	High
		Sidewalks		✓	✓	2019	Moderate
		Guard Rails	✓	✓		2019	Moderate
		Gateway Features		✓	✓	2019	Moderate
		Walkways/Trails		✓	✓	2019	Moderate
		Retaining Walls		✓	✓	2019	Moderate
	Traffic	Streetlights	✓	✓	✓	2017	Moderate
		Traffic Signs	✓	✓	✓	2019	Moderate
		Traffic Signals		✓	✓	2019	Moderate

3 Transportation Levels of Service

3.1 LEVELS OF SERVICE OVERVIEW

One of the major goals of asset management is to recognize and understand the balance between risks, performance and costs. Having clearly defined levels of services can result in:

- Everyone being able to identify the benefits of services provided as well as the associated costs.
- Allowing customers to consider the level of service provided by the Town of Milton within the context of affordability.
- Informing customers of the level of service that is currently in place and any future changes to the level of services and associated costs.
- Measuring the Town of Milton's performance against all the defined level of service enclosed in this AMP.

With the development of this AMP, the Town of Milton continues to focus on balancing customer needs, expectations and affordability. The vision for the Town is to establish critical level of service requirements, and to understand how costs and levels of service impact the range of services continually provided to citizens and businesses.

The development of the level of service (LOS) tables in this chapter are maintained through communication of staff members in all service areas for each respective service. The LOS tables are all structured the same for each service area. The key objective of these tables is to focus on council and citizen performance measures, technical measures, level of service objectives and identifying customer values. These measures are also aligned with the metrics listed in O. Reg 588/17.

3.2 REGULATED LEVELS OF SERVICE: TRANSPORTATION

Ontario's Requirements for Asset Management Planning

Over time, infrastructure continues to degrade which puts pressure on many services. The province of Ontario has implemented Asset Management Planning for Municipal Infrastructure Regulation, "O. Reg 588/17" as of January 1st, 2018. The purpose of this regulation is to help guide municipalities in planning and improving their future infrastructure.

O. Reg 588/17 requires two levels of service for core assets. The first is known as legislated community levels of service and the second is known as technical levels of service. Community levels of service use qualitative data to explain the scope of service delivered by a specific asset category. For instance, a map that illustrates different condition of pavement, while technical levels of service use metrics to explain scope of service delivered by a specific asset category. For instance, the average bridges condition based on a condition index. Table 21 below addresses levels of service metrics for transportation, as established by O. Reg 588/17.

Transportation Levels of Service

Table 21: Levels of Service Metrics Established by O. Reg 588/17 for Transportation Assets

Community Levels of Service	Reference	Technical Levels of Service	Current Performance
Description or images that illustrate the different levels of road class pavement condition.	Table 24	Average surface condition (e.g. excellent, good, fair or poor) for unpaved roads	Very Good
		Average surface condition for paved roads (PCI) weighted by replacement value	81[1]
Description or images of the condition of bridges and how this would affect use of the bridges.	Table **25**	For bridges in the municipality, average bridge condition index value (BCI) weighted by replacement value	72[2]
Description or images of the condition of culverts and how this would affect use of the culverts.	Table **25**	For structural culverts in the municipality, average bridge condition index value (BCI) weighted by replacement value	70[2]
Description, which may include maps, of the road network in the municipality and its level of connectivity.	Figure 16	# of lane-kilometers of arterial roads as a proportion of square kilometers of land area of the municipality.	11.16[1] lane-km/ square km
		# of lane-kilometers of collector roads as a proportion of square kilometers of land area of the municipality.	181.72[1] lane-km/ square km
		# of lane-kilometers of local roads as a proportion of square kilometers of land area of the municipality.	149.45[1] lane-km/ square km
Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	For the Town's portfolio of bridge assets, the mean for the average annual daily traffic (AADT) is approximately 3073 vehicles	% of bridges in the municipality with loading or dimensional restrictions	4%

[1] Based on the 2018 State of the Infrastructure & Management Study for Roads
[2] Based on the 2019 Municipal Structure Inventory and Inspection / Bridge Needs Study

Transportation Levels of Service

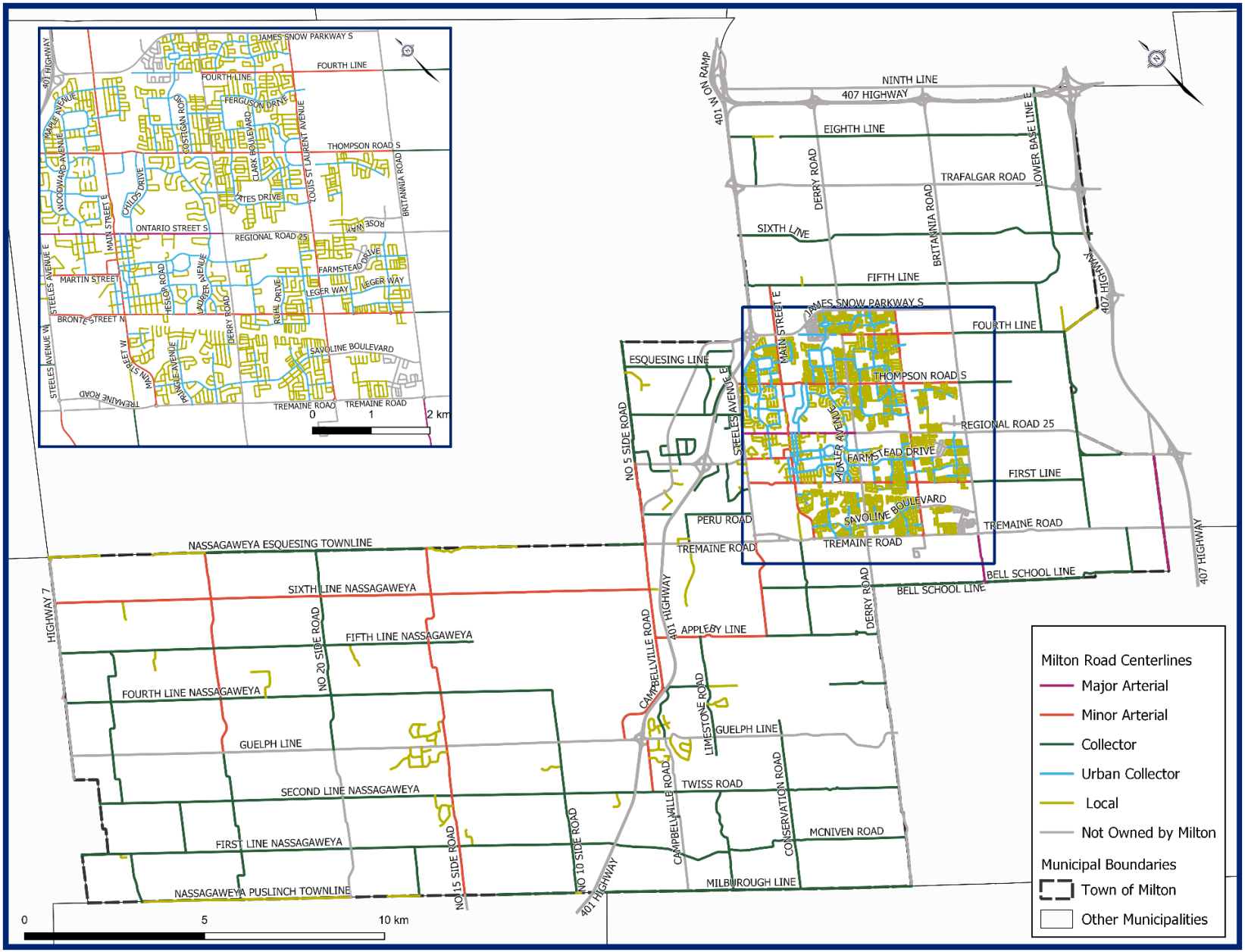


Figure 16: Town of Milton Road Network and Level of Connectivity

3.3 OTHER LOCALLY DEVELOPED COMMUNITY AND TECHNICAL FOCUSED PERFORMANCE MEASURES

Additional level of service performance metrics, developed by the Town to reflect citizen values and desires, are classified below by unique service attributes that summarize the type of service being provided to citizens, businesses, and the wider community.

These foundational and advanced metrics are listed in Table 22 and Table 23. Their development indicates service areas have documented planned approaches for the operations and maintenance of these infrastructure assets. Best practices consider the trends of these performance indicators with respect to the various levels of investment being decreased, increased, or to be approximately equal in future years. These performance measures use financial and condition assessment data, and more advanced metrics that may include data the Town needs to collect.

Table 22: Community Focused Performance Measures for Transportation Assets

Service Attribute	LOS Statement	Community Focused Performance Measures	
		Performance Measure	Current Performance
Cost Efficient	Providing an efficient transportation network for all modes	Average annual cost to provide transportation services ($/household)	$477
		Average transportation asset renewal rate (replacement value / historical 5-year capital spending)	177 years
Quality	Providing a transportation network at the appropriate material quality	% of road and right-of-way assets that meet the target condition of 70 (by replacement value)	78%
Environmental Stewardship	Providing transportation network that is environmentally conscious	% of streetlights that are energy efficient	25.9%

The following measures in Table 23 are similar to those in Table 22 above, however they are increasingly technical and intended for a deeper understanding of performance trends for various interested subject matter experts. These measures are provided to ensure decisions, especially those related to sustainability and vulnerabilities, are aligned with the most relevant and recent information about the Town's transportation infrastructure. Without technically focused performance metrics, the benefits from ongoing capital and operational planning decisions may not be fully appreciated, despite a wide range of effort behind the scenes.

Transportation Levels of Service

Table 23: Technical Focused Performance Measures for Transportation Assets

Service Attribute	LOS Statement	Technical Focused Performance Measures	
		Performance Measure	Current Performance
Cost Efficient	Providing an efficient transportation network for all modes	Average annual operating expenditures for transportation services	$7,443,878 (2015-2019)
		Average annual capital expenditure for roads and rights-of-way	$7,864,219 (2015-2019)
		5 Year average road linear asset renewal spending as a % of replacement value	0.6% (2015-2019)
		5 Year average road traffic asset renewal spending as a % of replacement value	1.3% (2015-2019)
Operational Excellence	Providing an operational road network that is safe for drivers, pedestrians, and cyclists	% of bridges and culvert structures in poor or very poor condition (as indicated by OSIM inspection data)	Bridges: 10%[3] Culverts: 14%[3]
		% of sidewalks in poor or very poor condition (i.e. condition score < 40)	0%
		% of walkways/trails in poor or very poor condition (i.e. condition score < 40)	5%
		% of paved roads in poor or very poor condition (i.e. PCI <= 75)	28%
		% of traffic signs in poor or very poor condition (i.e. condition score < 40)	0%
		% of bridges and culverts in compliance with Bridge Inspection Standard	100%
Operational Excellence	Providing an operational road network that is safe for drivers, pedestrians, and cyclists	# of bridges and culverts with reduced load limits	0
		% of bridges in the municipality with loading or dimensional restrictions (by replacement value)	4% dimensional restrictions

[3] Based on the 2019 Municipal Structure Inventory and Inspection / Bridge Needs Study

Transportation Levels of Service

Service Attribute	LOS Statement	Technical Focused Performance Measures	
		Performance Measure	Current Performance
Quality	Providing a transportation network at the appropriate material quality	% of roads in good or very good condition (i.e. PCI of >85)	83.7% to 85.8%[4,5]
		Total system adequacy for the road network	91%[5]
		% of sidewalks in good or very good condition (i.e. condition score >=60)	52%
		% of bridges by replacement value that meet the target average physical condition of a BCI of 65	85%[6]
Accessible	Providing an accessible transportation network in line with legislated requirements for AODA compliance within the Town right-of-way	# of kilometers of multi-use asphalt pathways	85km
Environmental Stewardship	Providing transportation network that is environmentally conscious	% of streetlights with LED or low energy fixtures	25.9%

The Town has adopted a replicable protocol for the roads network that associates the average quality of surface pavement assets with their estimated age. This approach uses a 100-point scale and ensures data is available to prioritize the capital and operational investments required to sustain the LOS objectives defined above. Images have been provided below in Table 24 to illustrate the various lifecycle stages along the spectrum associated with the pavement condition index (PCI) relative to the expected asset performance.

A good performance is associated with a PCI from 86-100, while pavement with fair performance has a PCI range from 85-76. Surface pavement in poor quality have a PCI from 75-56, and pavement with very poor quality have a PCI less than 55.

For similar reasons, the Town also evaluates the condition of its structure assets, including bridges and culverts, with a replicable condition assessment protocol, as defined by the Ontario Structure Inspection Manual (OSIM). The scale is called a bridge condition index (BCI) and is illustrated below in Table 25. This approach also uses a 0-100 scale with zero (0) being the lowest, and one hundred (100) being the best condition grade for a recently completed structure. A structure in very good condition is considered to have a BCI from 90-100. Structures in good condition

[4] Based on the 2018 State of the Infrastructure & Management Study for Roads using centreline kilometers
[5] Percentage varies based on if all metrics are considered or just structural adequacy
[6] Based on the 2019 Municipal Structure Inventory and Inspection / Bridge Needs Study

have a BCI range from 90-65 while structures in fair condition have a BCI range from 65-50. Structures in poor condition have a BCI between 50-40 and structures in very poor condition have a BCI less than 40.

Table 24: Pavement Condition Descriptions

Condition Description	Condition Grade	Illustration
Very Good/Good	Pavement Condition Index Score: 100-86 Renewal Works: Preservation, Crack Sealing	
Fair	Pavement Condition Index Score: 85-76 Renewal Works: Resurfacing Single Lift	
Poor	Pavement Condition Index Score: 75-56 Renewal Works: Resurfacing Double Lift	
Very Poor	Pavement Condition Index Score: 55-1 Renewal Works: Reconstruction	

Table 25: Bridge Condition Descriptions

Condition Description	Bridges	Culverts
Condition: Very Good BCI Range: 90-100 Like new condition		
Condition: Good BCI Range: 65-89 Maintenance is not usually required within the next five years		

Transportation Levels of Service

Condition Description	Bridges	Culverts
Condition: Fair BCI Range: 50-64 Maintenance work is usually scheduled within the next five years. This is the ideal time to schedule major bridge repairs to get the most out of bridge spending		
Condition: Poor BCI Range: 40-49 Maintenance work is usually scheduled within one year		

Transportation Levels of Service

Condition Description	Bridges	Culverts
Condition: Very Poor BCI Range: less than 40 Replacement or repairs required as soon as possible		

4 Transportation Lifecycle Management Strategy

4.1 LIFECYCLE ACTIVITIES TRANSPORTATION

This chapter of the Town's AMP focuses on the specific activities that maintain an acceptable level of performance related to the levels of service defined in the previous chapter. Documenting lifecycle activities, including those currently being performed and those that the Town are looking to perform in the future, is an important part of this AMP because they provide guidance for decision-makers who are managing various asset types, across a wide-range of condition states.

As the Town progresses in the development of future AMPs, their knowledge and understanding about which activities work best will be continually improved. The continual improvement of this chapter is supported by the collection and utilization of data that informs questions and answers about which activities work best and should be considered for each asset type, related to its current lifecycle state and various LOS performance metrics.

Appropriate and cost-effective strategies and plans are foundational to ensure service sustainability and to reduce the risks associated with a wide-range of evolving vulnerabilities at different levels, including the asset level, the associated infrastructure type, system or network level, and ultimately at the overall service level for the program area.

Without a defined set of preferred lifecycle activities for each asset, strategies for operations, maintenance, and capital investment can become uncoordinated and less effective in terms of costs and quality. As such, the Town collects performance information to assess and review the strategies, objectives, and plans that are generated from these preferred activities, developed from internal and external partners who are involved in maintaining service excellence objectives.

Table 26 includes all the various strategies defined throughout this section with check marks identifying which AM strategies are practiced.

Table 26: Lifecycle Activities Register: Transportation Services

Program Area	Asset Type	Asset		Non-Infrastructure Solutions	Maintenance Activities	Renewal/ Rehab Activities	Replacement/ Construction Activities	Disposal Activities	Service Improvement Activities	Growth Activities
Transportation Services	Roads & Structures	Roads	Urban	✓	✓	✓	✓	✓	✓	✓
			Semi Urban	✓	✓	✓	✓	✓	✓	✓
			Rural	✓	✓	✓	✓	✓	✓	✓
		Structures	Bridges	✓	✓	✓	✓	✓	✓	✓
			Culverts	✓	✓	✓	✓	✓	✓	✓
		Sidewalks		✓	✓	✓	✓	✓	✓	✓
		Guard Rails		✓	✓	✓	✓	✓	✓	✓
		Gateway Features		✓	✓	✓	✓	✓	✓	✓
		Walkways/Trails		✓	✓	✓	✓	✓	✓	✓
		Retaining Walls		✓	✓	✓	✓	✓	✓	✓
	Traffic	Traffic Signs		✓	✓	✓	✓	✓	✓	✓
		Traffic Signals			✓	✓	✓	✓	✓	✓
		Streetlights		✓	✓	✓	✓	✓	✓	✓

Table 27 summarizes various activities and asset management practices for the road network, along with the risks associated with the alternative do-nothing approach or practice. These lifecycle activities will be continually improved in future AMPs and are provided to guide decisions about which activities should be evaluated for various operational and capital investments, across all lifecycle stages. Without their inclusion and documentation, knowledge management issues may arise, especially related to maintaining the long-term continuity of quality services and inter-generational equity.

Table 27: Transportation: Road Network: Lifecycle Activities

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Non- Infrastructure Solutions Actions or policies that can lower costs or extend useful lives	• Encouragement to use public transportation, active transportation, and other modes of transportation • Establishing or updating levels of service • Further development in the Asset Management Program and policies • Employee training **Planned for Future** • Public engagement and consultation to obtain feedback	• Unplanned failures and service outages • Impacts to reputation, increased complaints • Risk management of public safety • Increased lifecycle costs • Poor information for decision-making • Ecological and biodiversity consequences • Overall quality of service and citizen experience
Maintenance Activities Including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events	• Pothole repair • Street sweeping • Salting and snow removal in the winter • Line painting every spring • Scheduled inspections • Minimum Maintenance Standards • Reactive maintenance when required	• Increased lifecycle costs • Risk management of public safety • Improper maintenance can lead to decreased asset life, premature asset failure, unplanned failures, and service outages • Road disruption and congestion
Renewal/ Rehab Activities Significant repairs designed to extend the life of the asset	• Scheduled or reactive renewal/rehab activities, such as: crack sealing, single lift (urban and semi-urban), expanded asphalt (rural), double lift (urban and semi-urban)	• Increased lifecycle costs • Risk management of public safety • Improper renewal/rehabilitation can lead to decreased asset life, premature asset failure, unplanned failures, and service outages • Road disruption and congestion

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Replacement/ Construction Activities Activities that are expected to occur once an asset has reached the end of its useful life and renewal/ rehab is no longer an option	• Road reconstruction	• Increased maintenance and rehabilitation costs • Risk management of public safety • Postponing replacement/reconstruction can lead to asset failure, unplanned failures, and service outages • Road disruption and congestion
Disposal Activities Activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality	• Disposal of asphalt	• Improper disposal may lead to environmental damage and further expenses
Service Improvement Activities Planned activities to improve an asset's capacity, quality, and system reliability	• Capital projects and maintenance to improve connectivity, quality and accessibility of roads throughout the Town	• Risk management of public safety on the roads • Decreased accessibility across Town
Growth Activities Planned activities required to extend services to previously unserved areas or expand services to meet growth demands	• Capital projects for road expansions to accommodate for growth in new and existing areas • Growth management planning including the Town's Official Plan that defines strategies to achieve the Provincial Growth Targets • Master Plans • Block Plans • Long-range fiscal planning	• Lack of expansion activities will lead to congestion on roads and actual residential and employment populations may not meet projected populations • Financial risk: overestimating or underestimating road expansions and other assets needed to meet growth demands

Table 28 summarizes various activities and asset management practices for the Town's structural bridges and culverts, along with the risks associated with the alternative do-nothing approach or practice. These lifecycle activities will be continually improved in future AMPs and are provided to guide decisions about which activities should be evaluated for various operational and capital investments, across all lifecycle stages. Without their inclusion and documentation, knowledge management issues may arise, especially related to maintaining the long-term continuity of quality services and inter-generational equity.

Table 28: Transportation: Structures: Bridges and Culverts: Lifecycle Activities

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Non- Infrastructure Solutions Actions or policies that can lower costs or extend useful lives	• Financial planning strategies to control costs • Updating the Town's design standards • Public awareness practices **Planned for Future** • Improvements to employee capabilities, communications, training, equipment, etc.	• Inadequate funding • Poor quality asset information • Regulatory requirements, standards, criteria change or do not exist • Economic fluctuations, inflation, downturns, revenue and use reduces/increases • Growth patterns not as planned • Occurrence of unforeseen events and emergencies resulting in funds being diverted to assets that were not originally planned
Maintenance Activities Including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events	• Street sweeping • Salting and snow removal in the winter • Deck flushing and drain cleanouts • Scheduled inspections • Minimum Maintenance Standards • Reactive maintenance based on results of biennial inspections **Planned for Future** • Spring power washing	• Completing annual maintenance activities while managing the need to execute reactive maintenance activities • Enough resources available to complete a series of unplanned and urgent work • Overscheduling of annual maintenance can lead to excessive maintenance and additional costs with no improvements to the level of service
Renewal/ Rehab Activities Significant repairs designed to extend the life of the asset	• Rehabilitation is based on age, estimated service life and the results of inspections and/or condition surveys	• Incorrect assumptions regarding improvement to useful life and/or condition following rehabilitation.

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Replacement/ Construction Activities Activities that are expected to occur once an asset has reached the end of its useful life and renewal/ rehab is no longer an option	• Replacement is based on age, estimated service life and the results of condition surveys	• Cost over-runs during large, complex design and construction projects • Accelerating maintenance and rehabilitation costs for assets in very poor condition • Risk management of public safety concerns as postponing replacement/reconstruction can lead to asset failure, unplanned failures, and service outages • Road disruption and congestion
Disposal Activities Activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality	• Structure will be closed and deconstructed • Disposals of assets under the applicable regulation and environmental standards	• Improper disposal may lead to environmental damage and further expenses
Service Improvement Activities Planned activities to improve an asset's capacity, quality, and system reliability	• Enhancements to current level of service	• Service improvement is either not required or incorrectly assessed • Risk management of public safety on the roads • Decreased accessibility across Town
Growth Activities Planned activities required to extend services to previously unserved areas or expand services to meet growth demands	• Growth management planning including the Town's Official Plan that defines strategies to achieve the Provincial Growth Targets • Master Plans • Block Plans • Long-range fiscal planning	• Lack of expansion activities will lead to congestion on roads and actual residential and employment populations may not meet projected populations • Financial risk: overestimating or underestimating road expansions and other assets needed to meet growth demands

Table 29 summarizes various activities and asset management practices for the Town's sidewalks, along with the risks associated with the alternative do-nothing approach or practice. These lifecycle activities will be continually improved in future AMPs and are provided to guide decisions about which activities should be evaluated for various operational and capital investments, across all lifecycle stages. Without their inclusion and documentation, knowledge management issues may arise, especially related to maintaining the long-term continuity of quality services and inter-generational equity.

Table 29: Transportation: Sidewalks: Lifecycle Activities

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Non- Infrastructure Solutions Actions or policies that can lower costs or extend useful lives	• Public encouragement to use public transportation, active transportation, and other modes of transportation to lower road costs **Planned for Future** • Collecting information on the type of users including their behavioral patterns and needs including pedestrian counts and sidewalk user feedback as provided.	• Impacts to reputation, increased complaints • Risk management of public safety • Increased lifecycle costs • Poor information for decision-making • Overall quality of service and citizen experience
Maintenance Activities Including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events	• Sidewalk leveling for uneven surface defects • Salting and snow removal • Vegetation growth maintenance • Litter clean-up	• Increased lifecycle costs • Risk management of public safety • Impacts ability to leverage asset for citizens needs including activities associated with active transportation and accessibility
Renewal/ Rehab Activities Significant repairs designed to extend the life of the asset	• Patching for cracked sidewalks • Repairing larger defects	• Increased lifecycle costs • Risk management of public safety • Impacts ability to leverage asset for citizens needs including activities associated with active transportation and accessibility
Replacement/ Construction Activities Activities that are expected to occur once an asset has reached the end of its useful life and renewal/ rehab is no longer an option	• Replacement of sidewalk segments and curbs. The Town is evaluating the need for new replacement or construction programs for replacement beyond the current annual programs.	• Increased maintenance and rehabilitation costs • Risk management of public safety • Postponing replacement/reconstruction can lead to accessibility and active transportation issues

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Disposal Activities Activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality	• Disposal of sidewalk segments and curbs that have been replaced	• Improper disposal may lead to environmental damage and further expenses
Service Improvement Activities Planned activities to improve an asset's capacity, quality, and system reliability	• Inspecting, measuring, and correcting defects that create hazards for users • Vegetation management • Graded ramps at intersections integrated with an urban braille system for accessibility purposes	• Cracks develop into trip hazards and create cost liabilities for the Town • Overgrown vegetation reduces quality and capacity • Users with accessibility requirements have service equality and equitability issues
Growth Activities Planned activities required to extend services to previously unserved areas or expand services to meet growth demands	• Capital projects to accommodate for intensification • Development projects to accommodate new communities, designed to the Town's engineering specifications and standards	• Lack of expansion activities will lead to congestion on roads and actual residential and employment populations may not meet projected populations • Financial risk: overestimating or underestimating road expansions and other assets needed to meet growth demands

Table 30 summarizes various activities and asset management practices for the Town's guard rails, along with the risks associated with the alternative do-nothing approach or practice. These lifecycle activities will be continually improved in future AMPs and are provided to guide decisions about which activities should be evaluated for various operational and capital investments, across all lifecycle stages. Without their inclusion and documentation, knowledge management issues may arise, especially related to maintaining the long-term continuity of quality services and inter-generational equity.

Table 30: Transportation: Guard Rails: Lifecycle Activities

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Non- Infrastructure Solutions Actions or policies that can lower costs or extend useful lives	• Replacements are on an as required basis as they fail, using newer designs and standards • This policy reduces the overall cost for the services provided by this asset type	• Impacts to reputation, increased complaints • Safety risks for road users • Increased lifecycle costs • Ecological and biodiversity consequences • Overall quality of service and citizen experience
Maintenance Activities Including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events	• Vegetation management • Inspections due to complaints and after car collisions • Grading roadway shoulder **Planned for Future** • Replacement or sealing gravel surfacing to prevent vegetation growth and erosion	• Poorly maintained assets likely increase the overall lifecycle costs • Risk management of public safety issues related to sight lines • Impacts ability to leverage asset for citizens needs including activities associated with active transportation and accessibility
Renewal/ Rehab Activities Significant repairs designed to extend the life of the asset	• Depending on their design, rehab activities will be scheduled after car collisions or unacceptable levels of erosion or weathering **Planned for Future** • Full replacements are scheduled for certain designs with cable components	• Increased lifecycle costs • Safety risks for road users • Impacts ability to leverage asset for citizens needs including activities associated with active transportation and accessibility
Replacement/ Construction Activities Activities that are expected to occur once an asset has reached the end of its useful life and renewal/ rehab is no longer an option	• Replacement after car collisions or unacceptable levels of erosion or weathering	• Increased maintenance and rehabilitation costs • Failed assets that are not replaced may create cost liabilities for the Town • Postponing replacement/reconstruction can lead to accessibility issues for active transportation users

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Disposal Activities Activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality	• Disposal of damaged guard rail segments • Recycling metal components appropriately	• Improper disposal may lead to environmental damage and further expenses
Service Improvement Activities Planned activities to improve an asset's capacity, quality, and system reliability	• Grading roadway shoulder • Replacement or sealing gravel surfacing to prevent vegetation growth and erosion	• Failed assets that are not replaced may create cost liabilities for the Town • Postponing replacement/reconstruction can lead to accessibility issues for active transportation users
Growth Activities Planned activities required to extend services to previously unserved areas or expand services to meet growth demands	• Capital projects to accommodate for intensification, connectivity issues, ditch or drainage concerns, etc. • Development projects to accommodate new communities, designed to the Town's engineering specifications and standards	• Lack of expansion activities will lead to congestion on roads and actual residential and employment populations may not meet projected populations • Financial risk: overestimating or underestimating road expansions and other assets needed to meet growth demands

Table 31 summarizes various activities and asset management practices for the Town's gateway features, along with the risks associated with the alternative do-nothing approach or practice. These lifecycle activities will be continually improved in future AMPs and are provided to guide decisions about which activities should be evaluated for various operational and capital investments, across all lifecycle stages. Without their inclusion and documentation, knowledge management issues may arise, especially related to maintaining the long-term continuity of quality services and inter-generational equity.

Table 31: Transportation: Gateway Features: Lifecycle Activities

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Non- Infrastructure Solutions Actions or policies that can lower costs or extend useful lives	• Collecting detailed design standards from development construction and circulating these to operations for comment to ensure their acceptability including cost to maintain **Planned for Future** • Engineering standards for development construction that incorporate materials and designs that are aligned with longer service life expectations and lower maintenance needs • Clearly documented responsibilities for the Town and relevant citizens, for scenarios where gateway features fail but are on citizen property	• Unplanned failures and service outages • Impacts to reputation, increased complaints • Increased lifecycle costs from exotic designs and materials that difficult to source in the future when they fail • Poor information for decision-making related to funding responsibilities for failing aged assets • Ecological and biodiversity consequences if invasive species can root, or where extensive garden beds cannot be maintained properly (watering plants, heat islands, etc.) • Overall quality of service and citizen experience with the community streetscape
Maintenance Activities Including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events	• Maintaining horticulture and forestry assets located in or around gateway features • Cleaning salt and sand from winter operations on gateway medians with signs, fencing, and other special or unique features • Inspections due to complaints including vehicular crashes and sight lines	• Increased lifecycle costs • Overall quality of right of way services and citizen experience with the community streetscape • Potential impacts to reputation where assets are deteriorated or overgrown • Risk management of public safety due to reduced sight lines
Renewal/ Rehab Activities Significant repairs designed to extend the life of the asset	• Rehab activities from car collisions and general weathering include minor reconstruction of failed or decayed components • General design alterations that simplify elaborate features where failing components cannot be maintained	• Increased lifecycle costs • Risk management of public safety due to reduced sight lines • Impacts ability to leverage asset for citizens needs including activities associated with active transportation and accessibility

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Replacement/ Construction Activities Activities that are expected to occur once an asset has reached the end of its useful life and renewal/ rehab is no longer an option	• Partial and full replacement, typically end of life, after car collisions, or extensive weathering	• Increased maintenance and rehabilitation costs for failing assets that should be replaced • Risk management of public safety due to reduced sight lines • Increased costs for communicating with concerned community groups or citizens
Disposal Activities Activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality	• Disposal of damaged and decayed gateway features • Recycling of metallic components	• Improper disposal may lead to environmental and reputational damage • Potential fines and further expenses • Overall quality of right of way services and citizen experience with the community streetscape
Service Improvement Activities Planned activities to improve an asset's capacity, quality, and system reliability	**Planned for Future** • General design alterations that simplify elaborate features where failing components cannot be maintained • Communication protocols with community groups or citizens for local improvements	• Increases costs for communicating with concerned community groups or citizens • Increased maintenance and rehabilitation costs for failing assets with elaborate features
Growth Activities Planned activities required to extend services to previously unserved areas or expand services to meet growth demands	• Growth in this asset type is led by development projects to accommodate new communities, designed to the Town's engineering specifications and standards	• Improperly managed growth may result in gateway features that are more expensive to maintain due to elaborate features, or complicated questions about ownership

Table 32 summarizes various activities and asset management practices for the Town's walkways and trails, along with the risks associated with the alternative do-nothing approach or practice. These lifecycle activities will be continually improved in future AMPs and are provided to guide decisions about which activities should be evaluated for various operational and capital investments, across all lifecycle stages. Without their inclusion and documentation, knowledge management issues may arise, especially related to maintaining the long-term continuity of quality services and inter-generational equity.

Table 32: Transportation: Walkways and Trails: Lifecycle Activities

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Non- Infrastructure Solutions Actions or policies that can lower costs or extend useful lives	**Planned for Future** • Continual improvement frameworks that collect data on designs, plans and strategies with the objective to improve assets and services with front-line staff	• Increased lifecycle costs • Potential mismatch of asset services and citizen expectations
Maintenance Activities Including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events	• Leveling for uneven pathway surfaces • Vegetation management • Litter clean-up	• Poorly maintained trails and walkways will impact user ability to leverage asset for citizen needs, including activities associated with active transportation and accessibility
Renewal/ Rehab Activities Significant repairs designed to extend the life of the asset	• Patching for paved pathways • Regrading of dirt pathways	• Poorly maintained trails and walkways will impact user ability to leverage asset for citizen needs, including activities associated with active transportation and accessibility
Replacement/ Construction Activities Activities that are expected to occur once an asset has reached the end of its useful life and renewal/ rehab is no longer an option	• Replacement of paved and gravel walkway or pathway segments	• Assets that have failed and remain in place without replacement create hazards for user safety and may increase cost liabilities for the Town if accidents occur • Accelerated erosion from heavy weather • Potential damage to reputation
Disposal Activities Activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality	• Disposal of paved pathway segments that have been replaced	• Improper disposal may lead to environmental and reputational damage • Potential fines and further expenses
Service Improvement Activities Planned activities to improve an asset's capacity, quality, and system reliability	• Capital projects to improve accessibility and connectivity within the Town's trail and walkway networks	• Potential damage to reputation • Impacts to service satisfaction

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Growth Activities Planned activities required to extend services to previously unserved areas or expand services to meet growth demands	• Capital and Master Plan projects • Development plans for new communities	• Potential damage to reputation • Impacts to service satisfaction • Risks to equitable and accessible services

Table 33 summarizes various activities and asset management practices for the Town's retaining walls, along with the risks associated with the alternative do-nothing approach or practice. These lifecycle activities will be continually improved in future AMPs and are provided to guide decisions about which activities should be evaluated for various operational and capital investments, across all lifecycle stages. Without their inclusion and documentation, knowledge management issues may arise, especially related to maintaining the long-term continuity of quality services and inter-generational equity.

Table 33: Transportation: Retaining Walls: Lifecycle Activities

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Non- Infrastructure Solutions Actions or policies that can lower costs or extend useful lives	**Planned for Future** • Ongoing inspections and studies to understand the service levels and identify improvement opportunities.	• Increased lifecycle costs • Potential collapse in extreme circumstances
Maintenance Activities Including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events	• Inspections due to complaints and after car collisions **Planned for Future** • Routine cleaning • Vegetation management	• Increased lifecycle costs • Risk management of public safety related to unchecked erosion that may lead to structural instability • Potential collapse in extreme circumstances
Renewal/ Rehab Activities Significant repairs designed to extend the life of the asset	• Rehab activities to restore the asset type resulting from car collisions and weathering	• Increased lifecycle costs • Potential damage to reputation resulting from a visually deteriorating streetscape

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Replacement/ Construction Activities Activities that are expected to occur once an asset has reached the end of its useful life and renewal/ rehab is no longer an option	• Replacement from car collisions and general weathering	• Increase in excessive and unwarranted maintenance and rehabilitation costs • Accelerated erosion and potential collapse in extreme circumstances • Dissatisfied and concerned citizens, especially those directly impacted or at risk
Disposal Activities Activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality	• Disposal of damaged retaining wall sections • Disposal of granular backfill and earth • Recycling of metallic components including gabion mesh / baskets	• Improper disposal may lead to environmental damage and further expenses • Potential damage to reputation
Service Improvement Activities Planned activities to improve an asset's capacity, quality, and system reliability	• Refacing or improving retaining walls to improve function and aesthetics	• Failure of the wall to meet visual or form requirements.
Growth Activities Planned activities required to extend services to previously unserved areas or expand services to meet growth demands	• Capital and Master Plan projects • Development plans for new communities	• Lack of expansion activities may risk an increase in instable environments • Damage other assets needed to meet growth demands

Table 34 summarizes various activities and asset management practices for the Town's streetlights, along with the risks associated with the alternative do-nothing approach or practice. These lifecycle activities will be continually improved in future AMPs and are provided to guide decisions about which activities should be evaluated for various operational and capital investments, across all lifecycle stages. Without their inclusion and documentation, knowledge management issues may arise, especially related to maintaining the long-term continuity of quality services and inter-generational equity.

Table 34: Transportation: Streetlights: Lifecycle Activities

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Non- Infrastructure Solutions Actions or policies that can lower costs or extend useful lives	• Policies that prefer LED or low energy and longer-life assets will reduce service costs	• Transacting and implementing contracts for LED or low energy retrofits can be complicated, time consuming, and ineffective • Service contracts can expire shortly before assets require full replacement
Maintenance Activities Including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events	• Light replacement • Lamp/fixture cleaning • Inspections due to road patrol results, complaints, and after car collisions	• Risk management of public safety risks related to illumination needs for some at risk areas or populations • Impacts ability to leverage asset for citizens needs including activities associated with active transportation and accessibility
Renewal/ Rehab Activities Significant repairs designed to extend the life of the asset	• Pole rehab activities from car collisions and general weathering	• Risk management of public safety for those in the area • Impacts ability to leverage asset for citizens needs including activities associated with active transportation and accessibility
Replacement/ Construction Activities Activities that are expected to occur once an asset has reached the end of its useful life and renewal/ rehab is no longer an option	• Pole replacement from car collisions and general weathering • LED retrofitting programs (or similar) to improve energy conservation measures • Electrical component replacements	• Risk management of public safety for those in the area • Postponing replacement/reconstruction can lead to accessibility issues and active transportation issues
Disposal Activities Activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality	• Appropriate disposal of light fixtures and damaged poles	• Improper disposal may lead to environmental damage and further expenses
Service Improvement Activities Planned activities to improve an asset's capacity, quality, and system reliability	• Installing new streetlights in poorly lit areas	• Risks fair, equitable treatment of communities • Increased costs for obsolete technology • Potential for reputation damage

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Growth Activities Planned activities required to extend services to previously unserved areas or expand services to meet growth demands	• Installing new streetlights in growing areas • Installing new streetlights on new roads	• Lack of expansion activities may impact congestion on roads and actual residential and employment populations may not meet projected populations • Potential for reputation damage for incomplete developments • Streetlights that are energized in new developments may create electricity expenses for the Town in areas where residents have not moved and where property tax is not yet collected to recover the expense

Table 35 summarizes various activities and asset management practices for the Town's traffic signs, along with the risks associated with the alternative do-nothing approach or practice. These lifecycle activities will be continually improved in future AMPs and are provided to guide decisions about which activities should be evaluated for various operational and capital investments, across all lifecycle stages. Without their inclusion and documentation, knowledge management issues may arise, especially related to maintaining the long-term continuity of quality services and inter-generational equity.

Table 35: Transportation: Traffic Signs: Lifecycle Activities

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Non- Infrastructure Solutions Actions or policies that can lower costs or extend useful lives	• Policies that prefer the installation of higher quality materials can lower the lifecycle costs by extending average life of a sign, especially in new developments • If facing a variety of directions, practices that centralize signs in an operational yard can reduce the time to estimate or measure the reflectivity of all signs in every community	• More frequent replacements due to decay from weathering, etc. • Increased costs from longer time to inspect the reflectivity of all signs as required
Maintenance Activities Including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events	• General road patrol • Inspections due to complaints and after car collisions • Cleaning due to weather	• Increased lifecycle costs • Risk management of public safety • Impacts ability to leverage asset for citizens needs including activities associated with active transportation and accessibility

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Renewal/ Rehab Activities Significant repairs designed to extend the life of the asset	• Sign rehab activities from car collisions and general weathering	• Increased lifecycle costs • Risk management of public safety • Impacts ability to leverage asset for citizens needs including activities associated with active transportation and accessibility
Replacement/ Construction Activities Activities that are expected to occur once an asset has reached the end of its useful life and renewal/ rehab is no longer an option	• Pole replacement from car collisions and general weathering	• Increased maintenance and rehabilitation costs • Risk management of public safety • Postponing replacement/reconstruction can lead to accessibility and active transportation issues
Disposal Activities Activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality	• Disposal of damaged poles and signs	• Improper disposal may lead to environmental damage and further expenses
Service Improvement Activities Planned activities to improve an asset's capacity, quality, and system reliability	• Installing new signs to reduce collisions and incidents in accident-prone areas	• Risks fair, equitable treatment of communities • Potential for reputation damage
Growth Activities Planned activities required to extend services to previously unserved areas or expand services to meet growth demands	• Installing new signs in growing areas • Installing new signs in accident-prone areas • Installing new signs on new roads	• Lack of signage for expansion activities may impact reputation, lead to congestion and reduce citizen satisfaction due to impact on general safety

Table 36 summarizes various activities and asset management practices for the Town's traffic signals, along with the risks associated with the alternative do-nothing approach or practice. These lifecycle activities will be continually improved in future AMPs and are provided to guide decisions about which activities should be evaluated for various operational and capital investments, across all lifecycle stages. Without their inclusion and documentation, knowledge management issues may arise, especially related to maintaining the long-term continuity of quality services and inter-generational equity.

Table 36: Transportation: Traffic Signals: Lifecycle Activities

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Non- Infrastructure Solutions Actions or policies that can lower costs or extend useful lives		
Maintenance Activities Including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events	• Road patrol • Reactive inspections due to complaints and after car collisions • Cleaning due to weathering • Reactive maintenance due to blackouts or weather • Replacing worn out components	• Risks less effective traffic signals, impacts road safety for all user types • Poor adherence to regulated requirements leading to financial penalties or impacts to reputation
Renewal/ Rehab Activities Significant repairs designed to extend the life of the asset	• Signal and pole rehab activities from car collisions and general weathering • Replacing or modernizing electrical components	• Risks less effective traffic signals, impacts road safety for all user types • Poor adherence to regulated requirements leading to financial penalties or impacts to reputation
Replacement/ Construction Activities Activities that are expected to occur once an asset has reached the end of its useful life and renewal/ rehab is no longer an option	• Signal and pole replacement from car collisions and general weathering	• Risks less effective traffic signals, impacts road safety for all user types • Poor adherence to regulated requirements leading to financial penalties or impacts to reputation
Disposal Activities Activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality	• Disposal of damaged poles and signals	• Improper disposal may lead to environmental damage and further expenses
Service Improvement Activities Planned activities to improve an asset's capacity, quality, and system reliability	• Upgrading unsignalized intersections to signalized intersections to reduce collisions and incidents in accident-prone areas	• Risk management of public safety • Impacts to reputation if left unchecked

Transportation Lifecycle Management Strategy

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Growth Activities Planned activities required to extend services to previously unserved areas or expand services to meet growth demands	• Installing new signals in growing areas • Installing new signals on new roads	• Risks less effective traffic signals, impacts road safety for all user types • Poor adherence to regulated requirements leading to financial penalties or impacts to reputation • Impacts to reputation if left unchecked

4.2 FORECASTED LIFECYCLE ACTIVITY COSTS

The following long-term investment forecast for Transportation uses a 100-year horizon to illustrate the capital and operational needs across the entire asset lifecycle from creation to disposal. The Town has a prudent financial process, but commonly maintenance activities are reflected as operating costs, while renewal and replacement activities are reflected in capital costs. Figure 17 illustrates the annual investment requirements for the Town's Transportation asset portfolio over 100 years, without additional assets from planned development. The Transportation infrastructure backlog is estimated to be approximately $112 million in 2021. This represents the replacement value of the assets that are operating beyond their intended life which may include assets in a "run to failure" mode of operation (for example, an industrial road with very low traffic).

The following long-term investment forecast for Transportation uses a 100-year horizon to illustrate the capital and operational needs across the entire asset lifecycle from creation to disposal. Note that this forecast does not include land assets in the analysis. Costs are based on recent tenders, condition assessments, studies with asset valuation assessments, and outputs from various accounting practices that are required for tangible capital assets. No inflation was applied to capital or operating costs.

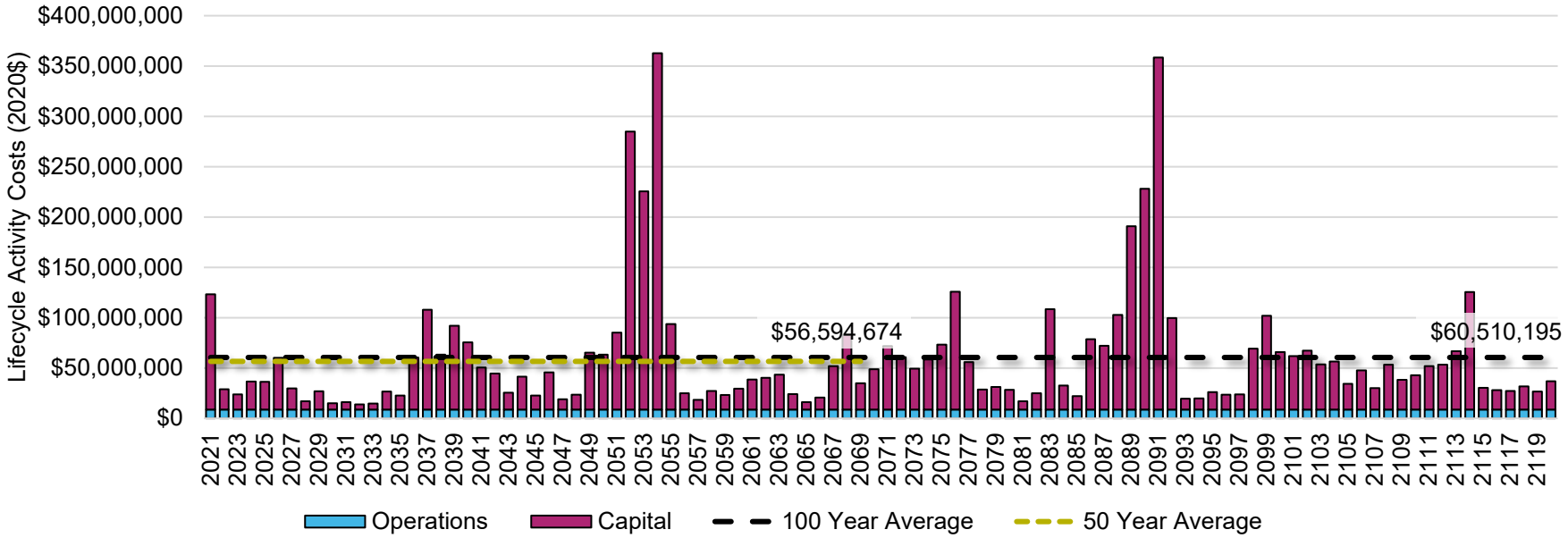


Figure 17: Forecasted Lifecycle Activity Costs - 100 Year Projection

Stormwater Services

5 Stormwater State of Local Infrastructure

5.1 STATE OF LOCAL INFRASTRUCTURE

Stormwater infrastructure is such a crucial part of daily life that it is often taken for granted. When a resident leaves their home, they can readily access goods and services safely in part because the rainwater runoff from various weather events is managed with infrastructure systems that minimize downstream flooding and erosion, while capturing and settling pollutants.

When stormwater systems are deficient, municipalities risk flooding, environmental damage and fines for not meeting regulated requirements and will eventually need to fund costly rehabilitation programs often at the expense of other public priorities and services. For these reasons, stormwater infrastructure is essential to supporting a strong economy and maintaining a high quality of life for citizens. This chapter provides a summary of the assets included in this community infrastructure system. The summary includes the best available information on replacement costs, age and condition profiles.

5.2 THE TOWN'S STORMWATER SYSTEM

The main goal of stormwater services is to ensure the ecological health of aquatic life, lakes and streams, reduce over land flooding, reduce flooding of homes, and provide overall control of stormwater runoffs. To provide these services, the Town of Milton builds and maintains a system of interconnected stormsewers, storm ponds, and various other supporting assets.

By preventing floods through engineering practices, the Town protects its citizens and ensures its drainage systems effectively transport water away from structural foundations, towards intended catchment areas. As a result, the quality and quantity of water drainage requirements are adequately controlled.

5.3 ASSET INVENTORY

This section summarizes the portfolio of infrastructure assets associated with the stormwater services managed by the Town of Milton. The associated performance requirements and specific thresholds that trigger investments like rehabilitation and replacement are described in the Levels of Service chapter and the Asset Lifecycle Management Strategy chapter. The information used to develop these profiles is described at the end of the chapter.

Stormwater infrastructure is categorized into stormsewers, storm ponds, manholes and catch basins, and oil grit separators. It should be noted that this inventory includes only assets owned by the Town which does not include any assets not yet assumed from developers. Replacement values for each asset include contingency, design and project management costs. The total amount of each asset being managed and maintained by the Town is summarized in Table 37, below. The counts for the Stormwater Network are based on GIS information rather than physical counts.

Table 37 The Town of Milton Stormwater Services Asset Inventory

Program Area	Asset Type	Asset	Count	Unit	Replacement Value (2020$)
Stormwater Services	**Stormwater Network**	Stormsewers	324,196	metres	$271.7M
		Manholes & Catch Basins	13,476	each	$88.2M
	Stormwater Management Facilities	Storm Ponds	25	each	$117.6M
		Oil/Grit Separators	23	each	$1.9M
Total Portfolio Replacement Value					**$479.4M**

(minor differences due to rounding)

5.4 ASSET VALUATION

Stormwater services are increasingly more important as the Town experiences more frequent and larger storms throughout the year in both summer and winter. Stormwater management reduces negative impacts to other infrastructure systems including the pollution levels for rural and urban lands that results from stormwater runoff. This is achieved with both management practices and physical structures. This section summarizes the various asset types included in this system, along with their estimated replacement value.

The Town of Milton's infrastructure assets for Stormwater Services is valued at $479.5M in current-year dollars, which includes the value of the assets and an additional 25% to cover contingency/design/etc. This breaks down into the stormsewers network with a replacement value of $360M, storm ponds with a replacement value of $117M and various other assets with a replacement value of $1.9M. These details are summarized along with their aggregated condition grades weighted by replacement value for each group in Table 38 below. The overall average condition score (weighted by replacement value) for Stormwater assets is 82. Details regarding specific condition values and supporting information sources is described in the proceeding sections.

Table 38: Asset Valuations for the Stormwater System (2020$, millions)

	Storm ponds	Storm Network	OGS
Total Replacement Value	$ 117.6	$ 360	$ 1.9
Average Condition Score	83	85	79

5.5 ASSET CONDITION

Condition scores have been estimated for all Stormwater assets based on the best available data and converted to a 1-100 scale (100 being very good condition) for ease of comparison. Based on the year the condition information was collected, the condition was degraded to provide an estimate of current condition. Where inspection data is unavailable, condition was estimated based on the age of the asset and its estimated service life. Unless otherwise noted, the condition values used within the AMP are these converted and degraded scores.

The condition score can then be categorized into five rating categories ranging from very good to very poor. Condition ratings were provided for every asset using the condition scale system as seen in Table 39 below. The rating scale is consistent with the Canadian Infrastructure Report Card (2016) to facilitate benchmarking between other Canadian municipalities and allows for comparisons between asset classes.

Table 39: Condition Rating Scale for the Stormwater System Assets

Value	Category	Condition Score	Description
1	Very Good	80% - 100%	The infrastructure in the system or network is generally in very good condition, typically new or recently rehabilitated. A few elements show general signs of deterioration that require attention.
2	Good	60% - 79%	The infrastructure in the system or network is in good condition, some elements show general signs of deterioration that require attention. A few elements exhibit significant deficiencies.
3	Fair	40% - 59%	The infrastructure in the system or network is in fair condition, it shows general signs of deterioration and requires attention. Some elements exhibit significant deficiencies
4	Poor	20% - 39%	The infrastructure in the system or network is in poor condition and mostly below standard, with many elements approaching the end of their service life. A large portion of the system exhibits significant deterioration.
5	Very Poor	0% - 19%	The infrastructure in the system or network is in unacceptable condition with widespread signs of advanced deterioration. Many components in the system exhibit signs of imminent failure, which is affecting service.

Based on the year the condition information was collected, the condition was degraded to provide an estimate of current condition. Where inspection data is unavailable, condition was estimated based on the age of the asset and its estimated service life. While this method helps to provide a general

understanding of the state of the infrastructure, it can underestimate the condition of asset portfolios as there are many assets that can continue to function beyond their anticipated service life, particularly if any renewal or rehabilitation work has been completed

Table 40: Asset Condition Details: Stormwater System, All Assets

Replacement Value:	$479.5 million	Data Confidence Grade:	Moderate: reliable sources, some assumptions required

Summary:

At the service level, the Town's Stormwater System is described in Figure 18 in terms of its current replacement costs by condition grade. The most significant assets in terms of replacement value are the stormsewers, valued at $271M. The Town's stormponds have an estimated current replacement value of $118M, the Town's manholes and catchbasins are valued at $88M, and the oil/grit separators have a replacement value of approximately $2M. The current lifecycle stage for each asset is illustrated in Figure 19 weighted by replacement value.

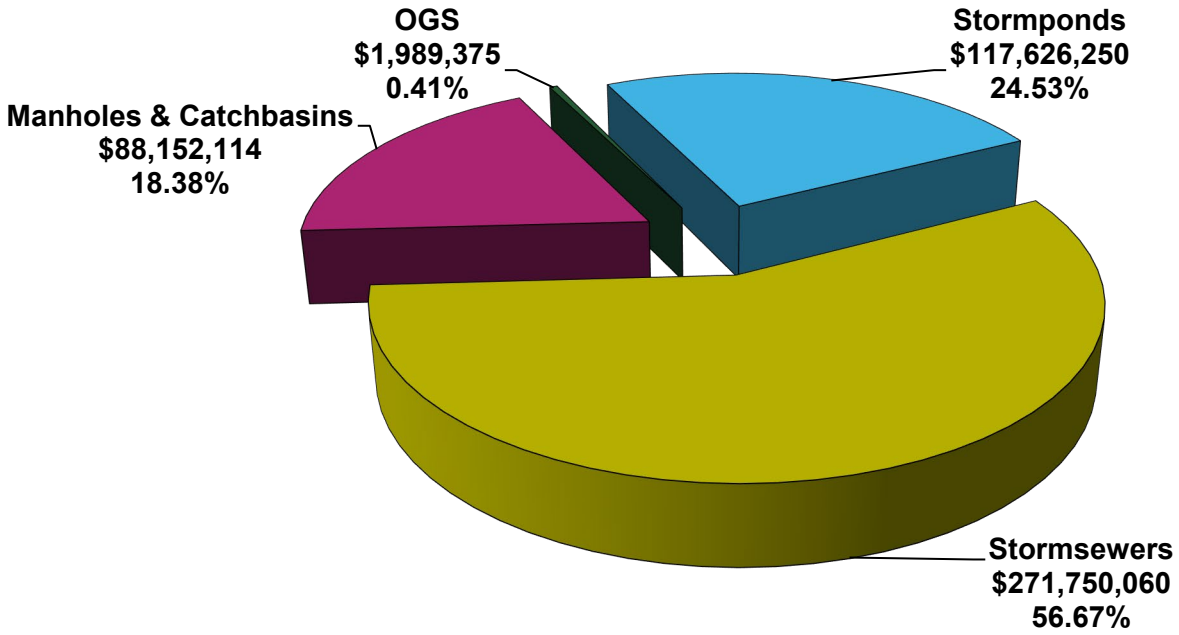


Figure 18: Asset Replacement Value for all Asset Types in the Stormwater System

Stormwater State of Local Infrastructure

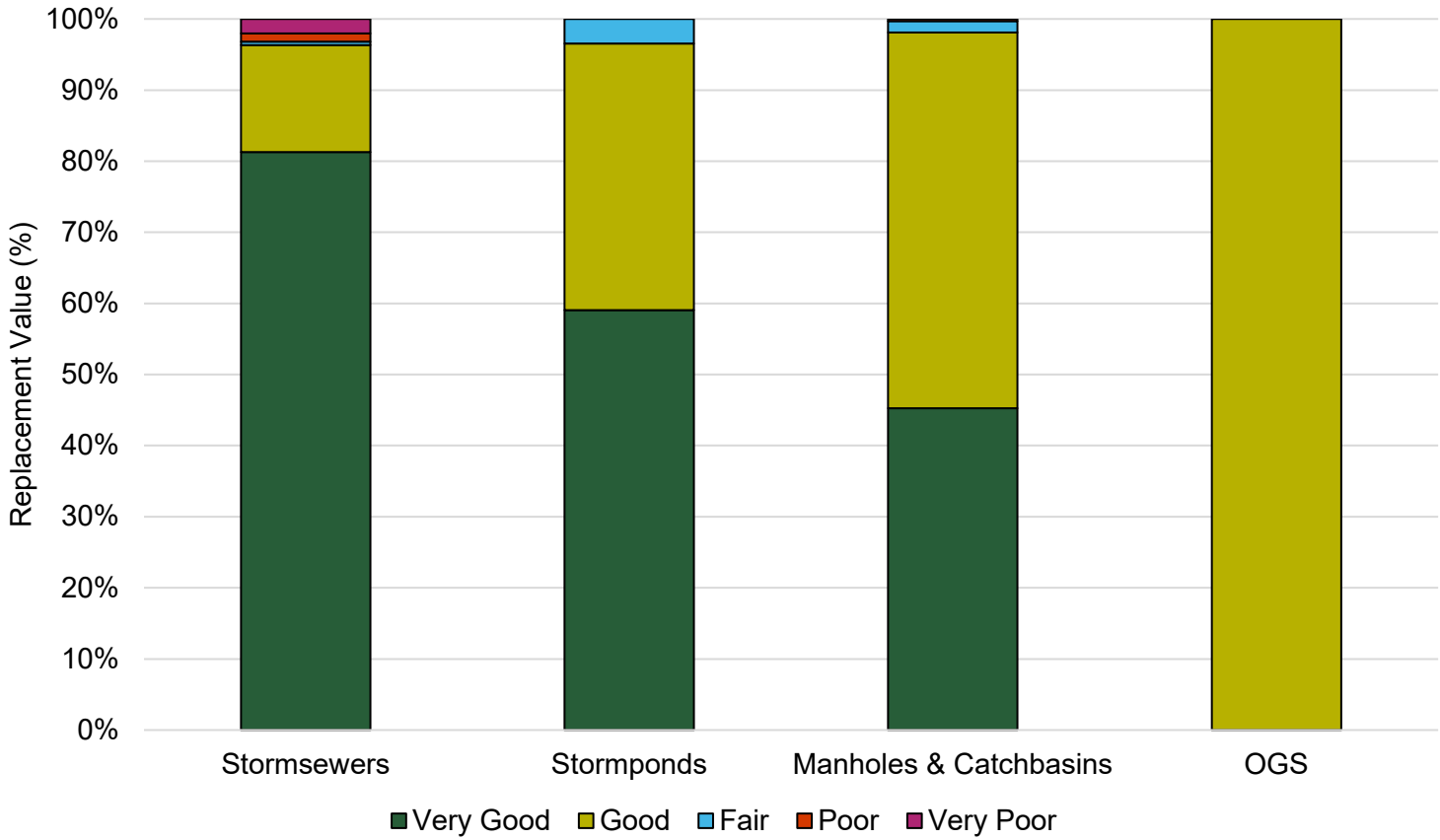


Figure 19: Stormwater System: Percentage Remaining Life by Replacement Value

Table 41: Asset Condition Details: Stormsewers

Replacement Value:	$271.7 million	Data Confidence Grade:	Moderate: reliable sources, some assumptions required
Average Age:	20 Years	Estimated Service Life:	75 Years
Asset Count:		324,196 m	

Summary:

Figure 20 describes the Town's stormsewers inventory and the proportion of the replacement value that falls into each condition category. The current replacement value for the Town's stormsewer network is approximately $271.7M. The majority of the Town's stormsewer assets, or 81% of the inventory, are in very good condition, 15% of assets are estimated to be in good condition, and a small portion of assets are considered to be in fair condition (1%), with 3% of assets in poor or very poor condition. The condition rating was based on the 2020 Storm Sewer Network Study where available, with the remaining estimated using a straight-line age-based method, it is only for estimation and may not reflect the real world condition of the assets. The Town performs inspections periodically to ensure assets are in working condition and would immediately address assets that are creating a public safety risk. In-depth condition assessments would be part of the Town's improvement plan for asset management.

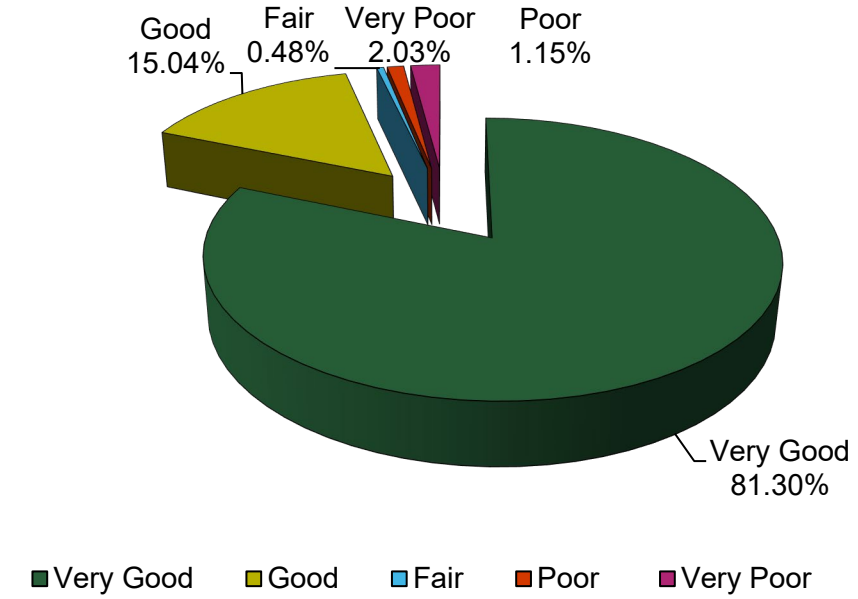


Figure 20: Asset Condition: Stormsewers

Table 42: Asset Condition Details: Storm Ponds

Replacement Value:	$117.6 million	Data Confidence Grade:	High: reliable sources, no assumptions required
Average Age:	14.76 Years	Estimated Service Life:	50 Years
Asset Count:		25 each	

Summary:

Figure 21 describes the Town's storm pond inventory and the proportion of the replacement value that falls into each condition category. The replacement value for the Town's storm ponds is approximately $117M. Approximately 59% of the Town's storm ponds are in very good condition with 38% of the inventory in good condition, 3% in fair condition and none falling into poor or very poor condition based on the 2020 Stormwater Management Facility Condition Assessment.

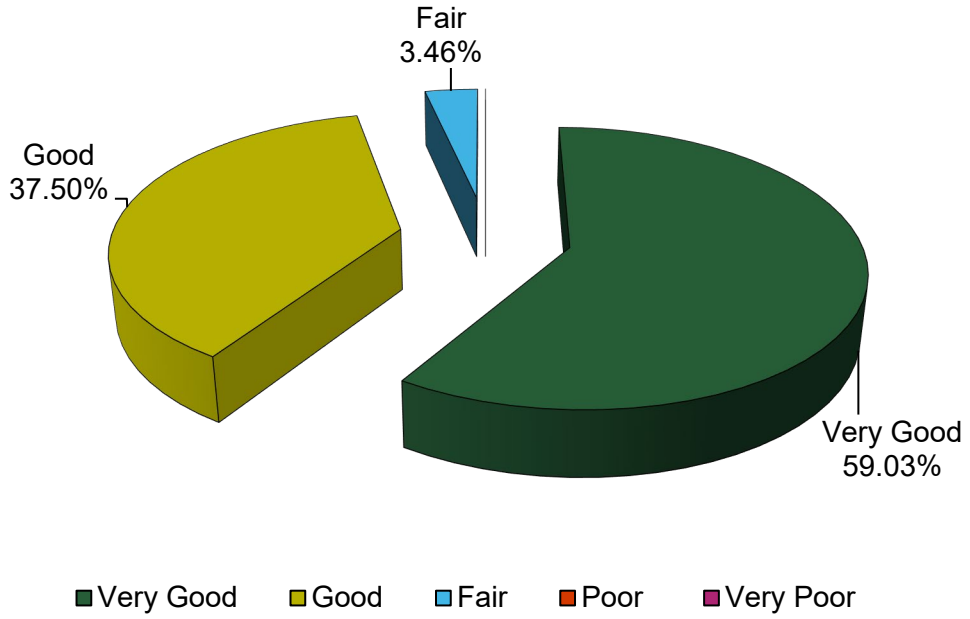


Figure 21: Asset Condition: Storm Ponds

Table 43: Asset Condition Details: Manholes and Catchbasins

Replacement Value:	$88.2 million	Data Confidence Grade:	Moderate: reliable sources, some assumptions required
Average Age:	8.89 Years	Estimated Service Life:	50 Years
Asset Count:		13,476 each	

Summary:

Figure 22 describes the Town's stormwater manholes and catch basin inventory and the proportion of the replacement value that falls into each condition category. The replacement value for the Town's stormwater manholes and catchbasins is approximately $88.2M. Approximately 45% of the Town's stormwater manholes and catchbasins are in very good condition, with another 53% in good condition, while 2% of the inventory are in fair condition, and only a small portion falling into poor or very poor condition. The condition rating was based on recent inspections where available, with the remaining estimated using a straight-line age-based method, it is only for estimation and may not reflect the real world condition of the assets. The Town performs inspections periodically to ensure assets are in working condition and would immediately address assets that are creating a public safety risk. In-depth condition assessments would be part of the Town's improvement plan for asset management.

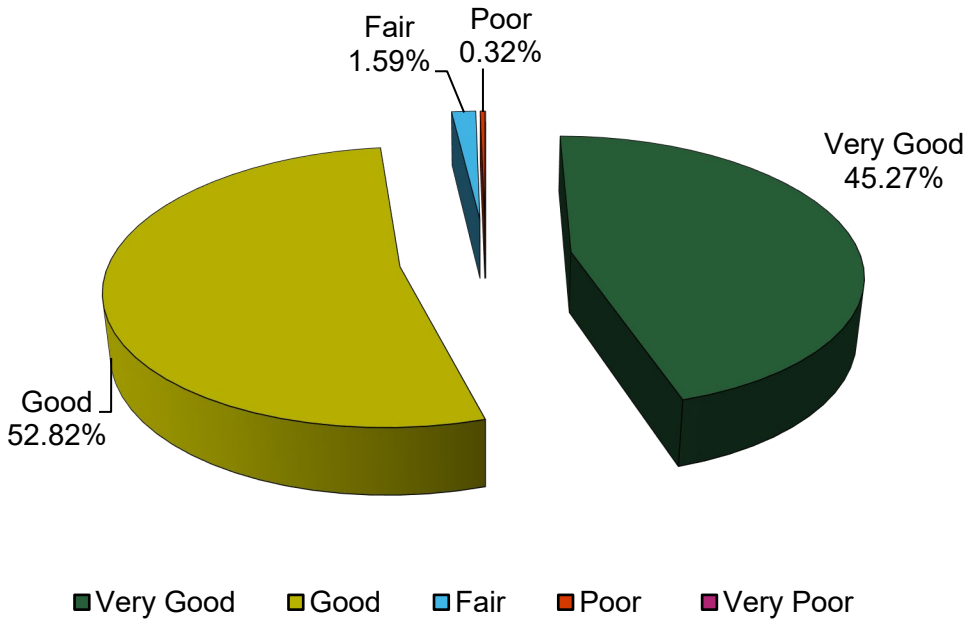


Figure 22: Asset Condition: Manholes & Catchbasins

Table 44: Asset Condition Details: Oil/Grit Separators

Replacement Value:	$1.9 million	Data Confidence Grade:	High: reliable sources, no assumptions required
Average Age:	10.30 Years	Estimated Service Life:	50 Years
Asset Count:		23 each	

Summary:

Figure 23 describes the Town's oil/grit separator inventory and the proportion of the replacement value that falls into each condition category. The replacement value for the Town's oil/grit separators is approximately $1.9M. Based on the available condition data all oil/grit separators are in good condition based on available condition information.

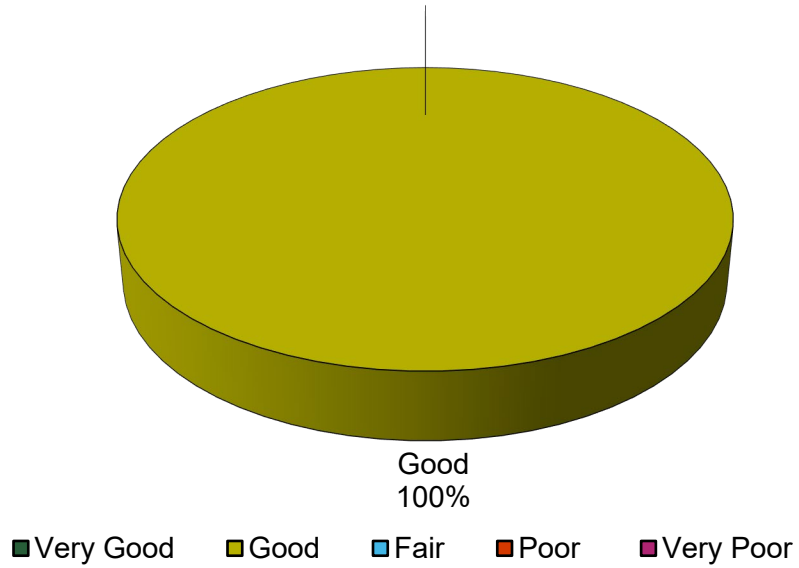
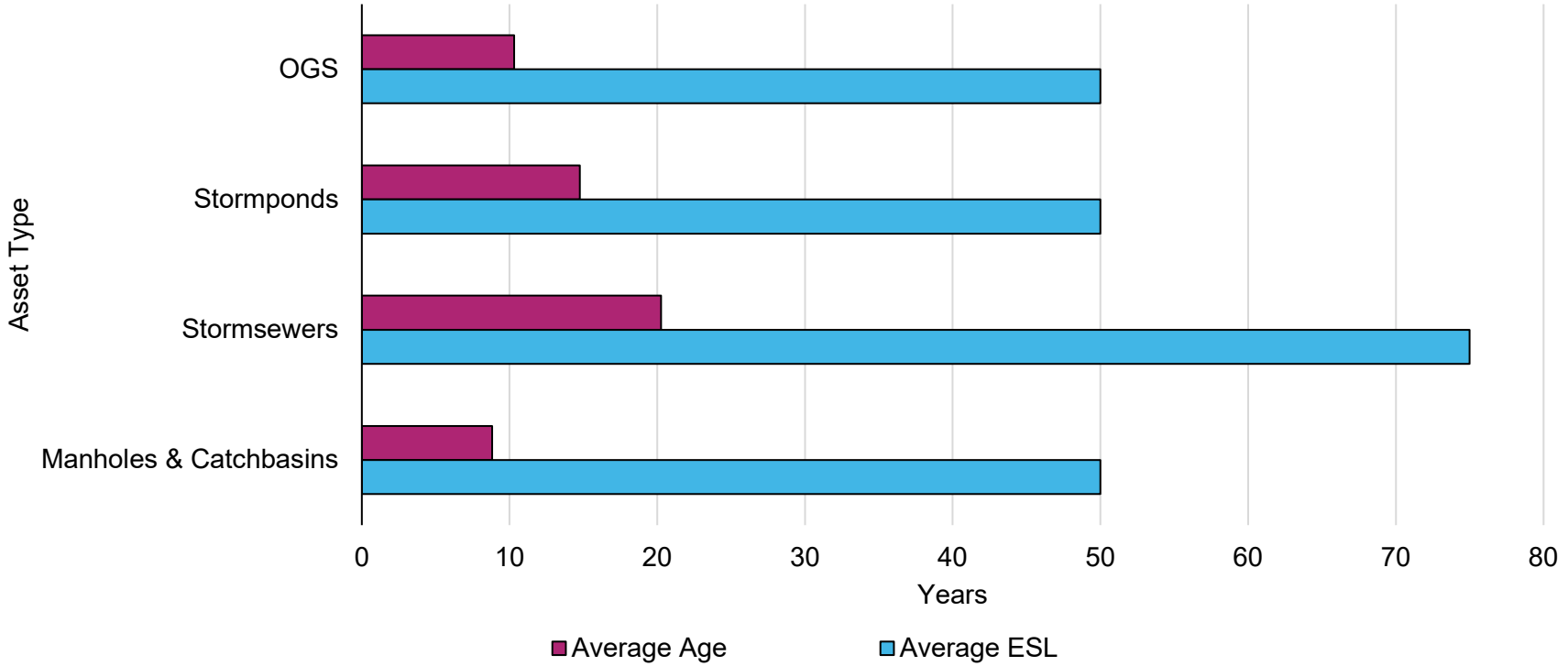


Figure 23: Asset Condition: Oil/Grit Separators

5.6 AGE SUMMARY

Another way of visualizing the state of various asset types is to compare the average age for every asset taken altogether, against that asset type's expected useful life. While this is a general illustration with additional nuances described and illustrated in the preceding sections, Figure 24 below summarizes the average ages of each asset type.

Figure 24: Average Age as a Proportion of Expected Service Life by Asset Type (Stormwater System, All Asset Types)



5.7 DATA SOURCES

Table 45 outlines the data used to support the assessments of the Town's infrastructure assets. Condition data can be collected from a variety of sources. Inspections can be carried out on site to log specific defects, this type of information is typically considered the most reliable and accurate because it is typically supported by regulatory requirements. As an example, stormwater pipes have inspection information requirements defined by the North American Standard for pipeline defect identification and assessment, developed in partnership with the Water Research Center (WRc) from the United Kingdom. Annual Storm Pond and Oil/Grit Separators inspections are also undertaken as per ECA requirements. Where condition data is unavailable, condition was estimated based on the age of the asset. The Town also continually updates its financial accounting data with generally accepted practices as defined by the Public Sector Accounting Board (PSAB). Financial data can be found online, in the Town's annual submissions to the Ministry of Municipal Affairs and Housing.

Data confidence levels are based on the reliability of data sources and the amount of assumptions required. High confidence data requires no assumptions and is from reliable sources (e.g. data from recent condition assessments that include all required fields), while low confidence data requires numerous assumptions and/or is from less reliable data sources (e.g. data that required condition to be estimated based on age). In some cases, data may have a lower confidence score even if all data is available if the data cannot be linked to the inventory or is not in a format required for the AMP analysis.

Table 45: Municipal Approach to Assessing Asset Condition, Stormwater Services

Program Area	Asset Type	Asset	Condition Data	Existing Asset Data	Accounting Data	Year of Record	Data Confidence
Stormwater Services	Stormwater	Stormsewers	✓	✓	✓	2018	Moderate
		Storm Ponds	✓	✓	✓	2019	High
		Manholes & Catchbasins	✓	✓		2019	Moderate
		Oil/Grit Separators	✓	✓		2019	High

6 Stormwater Level of Service

6.1 LEVELS OF SERVICE OVERVIEW

One of the major goals of asset management is to recognize and understand the balance between risks, performance and costs. Having clearly defined levels of services can result in:

- Everyone being able to identify the benefits of services provided as well as the associated costs.
- Allowing customers to consider the level of service provided by the Town of Milton within the context of affordability.
- Informing customers of the level of service that is currently in place and any future changes to the level of services and associated costs.
- Measuring the Town of Milton's performance against all the defined level of service enclosed in this AMP.

With the development of this AMP, the Town of Milton continues to focus on balancing customer needs, expectations and affordability. The vision for the Town is to establish critical level of service requirements, and to understand how costs and levels of service impact the range of services continually provided to citizens and businesses.

The development of the level of service (LOS) tables in this chapter are maintained through communication of staff members in all service areas for each respective service. The LOS tables are all structured the same for each service area. The key objective of these tables is to focus on council and citizen performance measures, technical measures, level of service objectives and identifying customer values. These measures are also aligned with the metrics listed in O. Reg 588/17.

6.2 REGULATED LEVELS OF SERVICE: STORMWATER

Ontario's Requirements for Asset Management Planning

Over time, infrastructure continues to degrade which puts pressure on many services. Some infrastructure assets that could place pressure on stormwater services as they degrade include stormsewers, storm ponds, manholes, catch basins, oil and grit separators and many others. The province of Ontario has implemented Asset Management Planning for Municipal Infrastructure Regulation, "O. Reg 588/17" as of January 1st, 2018. The purpose of this regulation is to help guide municipalities in planning and improving their future infrastructure.

O. Reg 588/17 requires two levels of service for core assets. The first is known as legislated community levels of service and the second is known as technical levels of service. Community level use qualitative data to explain the scope of service delivered by a specific asset category. For instance, a map that illustrates different condition of manholes. While technical levels use metrics to explain scope of service delivered by a specific asset category. For instance, the average stormsewer condition based on a condition index. The regulatory requirements for stormwater levels of service metrics are included in Table 46, below.

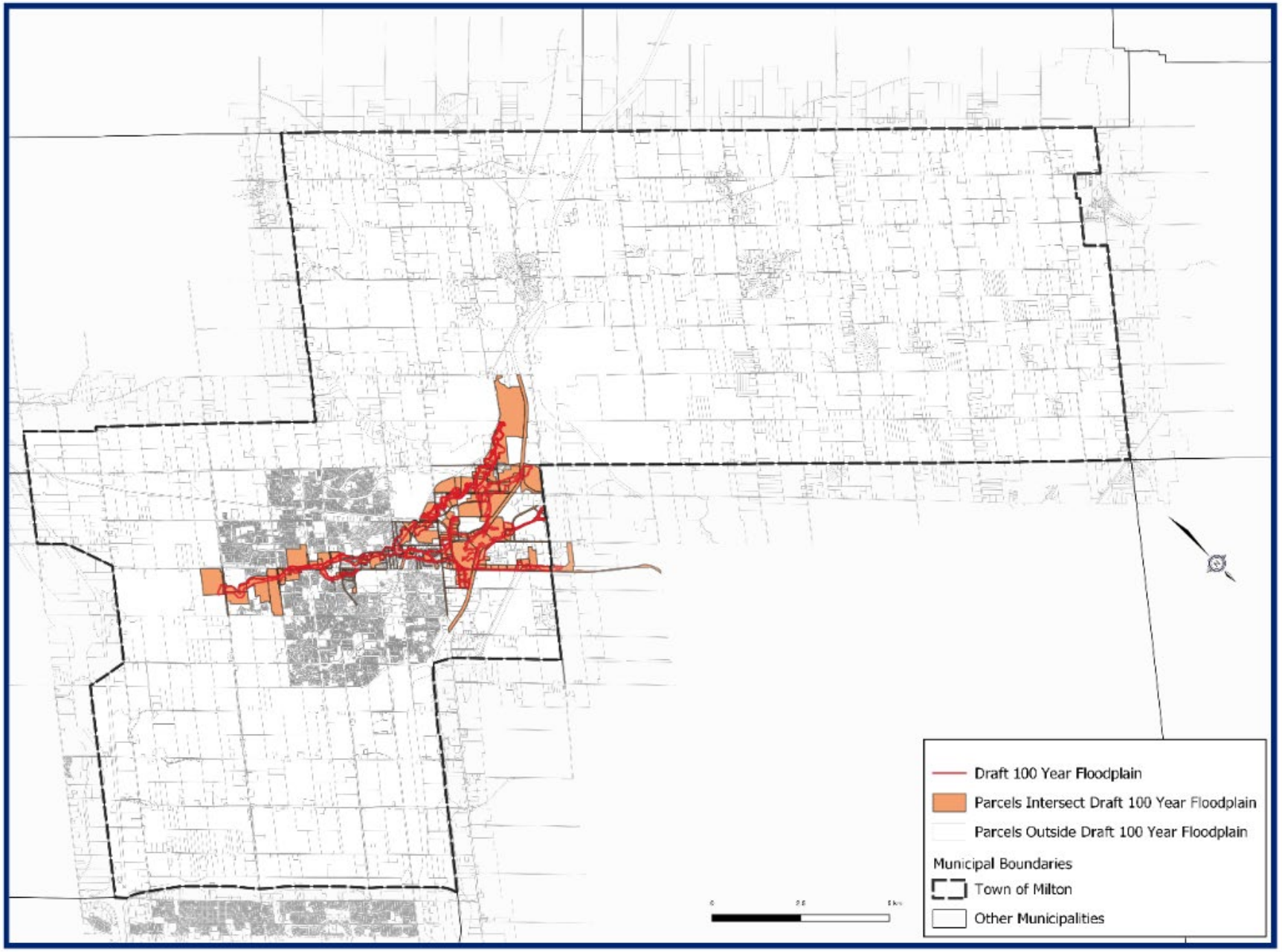
Table 46: Levels of Service Metrics Established by O. Reg 588/17 for Stormwater Assets

Community Levels of Service	Reference	Technical Levels of Service	Current Performance
Description, which may include maps, of the user groups or areas of the municipality that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system.	**Figure 25**	Percentage of properties in municipality resilient to a 100-year storm.	98.99%[7]
		Percentage of the municipal stormwater management system resilient to a 5-year storm.	100%[8] at low risk

[7] Information regarding the Town's 100-year storm data is currently under development. The information presented in this section was still in a draft stage at the point of developing this plan. Although all reasonable attempts were made to avoid inaccuracies in the data provided, this version of the Town's CAM Plan cannot provide a guarantee on the accuracy of the data and any use of this data is at the discretion and risk of the user.

[8] This version of the Town's CAM Plan uses age of development as a proxy for design standards and land use planning policies to determine number of properties resilient to a 5-year storm. The Town's fully separated stormwater management system is considered low risk because it was constructed after 1990, when infrastructure standards and dual-drainage design practices were introduced to accommodate major system flows during extreme rainfall events, in combination with master environmental service planning including drainage. Future revisions will include more sophisticated information from sources such as hydrologic and hydraulic modelling, infrastructure criticality values, and an assessment of the social impacts of flooding.

Figure 25: Property Parcels Intersecting Draft 100-Year Floodplain



6.3 OTHER LOCALLY DEVELOPED COMMUNITY AND TECHNICAL FOCUSED PERFORMANCE MEASURES

Additional level of service performance metrics, developed by the Town to reflect citizen values and desires, are classified below by unique service attributes that summarize the type of service being provided to citizens, businesses, and the wider community.

These foundational and advanced metrics are listed in Table 47 and Table 48. Their development indicates service areas have documented planned approaches for the operations and maintenance of these infrastructure assets. Best practices consider the trends of these performance indicators with respect to the various levels of investment being decreased, increased, or to be approximately equal in future years. These performance measures use financial and condition assessment data, and more advanced metrics may include data the Town needs to collect.

Table 47: Community Focused Performance Measures for Stormwater Assets

Service Attribute	LOS Statement	Community Focused Performance Measures	
		Performance Measure	Current Performance
Cost Efficient	Providing stormwater services in an efficient manner	Average annual cost to provide stormwater services ($/household)	$29
		Average stormwater asset renewal rate (replacement value / historical 5 year capital spending)	768 years

The following measures in Table 48 are similar to those in Table 47 above, however they are increasingly technical and intended for a deeper understanding of performance trends for various interested subject matter experts. These measures are provided to ensure decisions, especially those related to sustainability and vulnerabilities, are aligned with the most relevant and recent information about the Town's stormwater infrastructure. Without technically focused performance metrics, the benefits from ongoing capital and operational planning decisions may not be fully appreciated, despite a wide range of effort behind the scenes.

Table 48: Technical Focused Performance Measures for Stormwater Assets

Service Attribute	LOS Statement	Technical Focused Performance Measures	
		Performance Measure	Current Performance
Cost Efficient	Providing stormwater services in an efficient manner	Average annual operating expenditures for stormwater	$354,658 (2015-2019)
		Average annual capital expenditure for stormwater	$593,023 (2015-2019)
		5 Year average stormwater linear asset renewal spending as a % of replacement value	0.1% (2015-2019)

Stormwater Levels of Service

Service Attribute	LOS Statement	Technical Focused Performance Measures	
		Performance Measure	Current Performance
		5 Year average stormwater management pond asset renewal spending as a % of replacement value	0.2% (2015-2019)
Reliability	Providing stormwater services with minimal impact to the community	% of stormsewers by replacement value in poor or very poor condition	3.2%
		% of all stormwater assets by replacement value in poor or very poor condition	1.9%
		% of inspections & maintenance carried out on oil/grit separators annually	100%
Environmental Stewardship	Providing stormwater services that protect the environment	# of SWM ponds that have exceeded their target dredging frequency	0

7 Stormwater Lifecycle Management Strategy

7.1 LIFECYCLE ACTIVITIES STORMWATER

This chapter of the Town's AMP focuses on the specific activities that maintain an acceptable level of performance related to the levels of service defined in the previous chapter. Documenting lifecycle activities, including those currently being performed and those that the Town are looking to perform in the future, is an important part of this AMP because they provide guidance for decision-makers who are managing various asset types, across a wide-range of condition states.

As the Town progresses in the development of future AMPs, their knowledge and understanding about which activities work best will be continually improved. The continual improvement of this chapter is supported by the collection and utilization of data that informs questions and answers about which activities work best and should be considered for each asset type, related to its current lifecycle state and various LOS performance metrics.

Appropriate and cost-effective strategies and plans are foundational to ensure service sustainability and to reduce the risks associated with a wide-range of evolving vulnerabilities at different levels including the asset level, the associated infrastructure type, system or network level, and ultimately at the overall service level for the program area.

Without a defined set of preferred lifecycle activities for each asset, strategies for operations, maintenance, and capital investment can become uncoordinated and less effective in terms of costs and quality. As such, the Town collects performance information to assess and review the strategies, objectives, and plans that are generated from these preferred activities, developed from internal and external partners who are involved in maintaining service excellence objectives.

Table 49 includes all the various strategies defined throughout this section with check marks identifying which AM strategies are practiced.

Table 49: Lifecycle Activities Register: Stormwater Services

Program Area	Asset Type	Asset	Non-Infrastructure Solutions	Maintenance Activities	Renewal/ Rehab Activities	Replacement/ Construction Activities	Disposal Activities	Service Improvement Activities	Growth Activities
Stormwater Services	Stormwater	Stormsewers	✓	✓	✓	✓	✓	✓	✓
		Storm ponds	✓	✓	✓	✓	✓	✓	✓
		Manholes & Catch Basins	✓	✓	✓	✓	✓	✓	✓
		Oil/Grit Separators	✓	✓	✓	✓	✓	✓	✓

The following table summarizes various activities and asset management practices for the Town's stormsewers, along with the risks associated with the alternative do-nothing approach or practice. These lifecycle activities will be continually improved in future AMPs and are provided to guide decisions about which activities should be evaluated for various operational and capital investments, across all lifecycle stages. Without their inclusion and documentation, knowledge management issues may arise, especially related to maintaining the long-term continuity of quality services and inter-generational equity.

Table 50: Stormwater: Stormsewers: Lifecycle Activities

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Non- Infrastructure Solutions Actions or policies that can lower costs or extend useful lives	• Policies that prioritize the sustainability of natural watersheds, especially their stormwater management functions, can reduce the need for additional stormwater services and assets	• Larger, more frequent storms may cause risks for flood events to materialize, including damage to private property, businesses, and requirements to escalate emergency response activities
Maintenance Activities Including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events	• Continued maintenance on a regular basis will extend service life and improve performance levels • Flushing, cleaning, inspections, daylighting	• A lack of maintenance and inspections will increase the risk of premature failures while decreasing the available information to make informed decisions about resource allocations
Renewal/ Rehab Activities Significant repairs designed to extend the life of the asset	• Rehab as needed with cured-in-place (CIPP) lining, pipe bursting, open cut, etc. • Spot repairs with grouting, replacement, open cut, etc.	• Accelerating maintenance and inspection costs while decreasing their effectiveness • Premature failures • Decrease in funding available for other municipal policy priorities as funds are directed to reactive replacements and claims
Replacement/ Construction Activities Activities that are expected to occur once an asset has reached the end of its useful life and renewal/ rehab is no longer an option	• Capital planning and program for active replacement of pipes (e.g., with open cut, CIPP, etc.), when there are critical defects that affect service provision such as infiltration due to fractures, cracks, surface damage or broken liners	• Accelerating maintenance and inspection costs while decreasing their effectiveness • Premature failures • Decrease in funding available for other municipal policy priorities as funds are directed to reactive replacements and claims

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Disposal Activities Activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality	• Disposal of stormsewer pipe segments that have been replaced by the most environmentally suitable means • Filling abandoned pipes with cement and leaving buried in place	• Improper disposal may lead to environmental damage and further expenses • Possible reputational damage for poorly coordinated disposal activities from active community groups and environmentalist
Service Improvement Activities Planned activities to improve an asset's capacity, quality, and system reliability	• Complete asset management planning for all stormwater assets and activities **Planned for Future** • Refine cost estimates for maintenance activities by tracking and analyzing actual costs • Evaluate opportunities for improvement of the program by refining performance measures • Develop training programs for internal or external inspection including preparations for storm events (clearing catch basins, outfalls, etc.) • Evaluate options for contracting activities versus completing O&M activities internally	• Risks fair, equitable treatment of communities • Potential for reputation damage from ongoing flood events and associated health hazards for those impacted, especially elderly and low-income families
Growth Activities Planned activities required to extend services to previously unserved areas or expand services to meet growth demands	• Capital and Master Plan projects • Development plans for new communities	• Risks fair, equitable treatment of communities • Potential for reputation damage from ongoing flood events and associated health hazards for those impacted, especially elderly and low-income families • Potential disruption to businesses leading to a loss of interest in commercial developments due to impaired or permanently reduced income potential

Table 51 summarizes various activities and asset management practices for the Town's storm ponds, along with the risks associated with the alternative do-nothing approach or practice. These lifecycle activities will be continually improved in future AMPs and are provided to guide decisions

about which activities should be evaluated for various operational and capital investments, across all lifecycle stages. Without their inclusion and documentation, knowledge management issues may arise, especially related to maintaining the long-term continuity of quality services and inter-generational equity.

Table 51: Stormwater: Storm Ponds: Lifecycle Activities

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Non- Infrastructure Solutions Actions or policies that can lower costs or extend useful lives	• Documenting an inventory of the range and size of the components at each storm pond • Monitoring the condition of the storm ponds on a regular basis for quality and quantity attributes • If the condition can be managed until a dredging project, extending useful life until other major site work will create efficiency by combing minor and major capital work	• Larger, more frequent storms may cause risks for flood events to materialize, including damage to private property, businesses, and requirements to escalate emergency response activities • Potential reputational damage from unnecessarily high or unaffordable expenses
Maintenance Activities Including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events	• Maintaining vegetation, removing trash, removing inlet/ outlet obstructions, basic channel cleaning, maintain the aesthetic of the facility (e.g., grass mowing), clearing of conveyance channels • Measuring sediment build-up • Annual inspections after routine maintenance as a quality check	• A lack of maintenance and inspections will increase the risk of premature failures while decreasing the available information to make informed decisions about resource allocations • Potential reputational damage from over grown brush and accelerating erosion without adequate or effective security features • Heat island effects impacting health and impairing amenities provided by the asset, especially for elderly populations

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Renewal/ Rehab Activities Significant repairs designed to extend the life of the asset	• Replanting, landscaping, hydroseeding, tree removal • Pond dredging • Regrading and paving • Safe removal and disposal of assets from the system	• Potential reputational damage from over grown brush and accelerating erosion without adequate or effective security features • Heat island effects impacting health and impairing amenities provided by the asset, especially for elderly populations • Larger, more frequent storms may cause risks for flood events to materialize, including damage to private property, businesses, and requirements to escalate emergency response activities
Replacement/ Construction Activities Activities that are expected to occur once an asset has reached the end of its useful life and renewal/ rehab is no longer an option	• Replacement activities address pond components including the concrete structure headwall, manholes, fencing around inlet, outlets, and eroded or damaged riprap apron	• Larger, more frequent storms may cause risks for flood events to materialize, including damage to private property, businesses, and requirements to escalate emergency response activities • Delayed capital replacement activities can accelerate the deterioration of components that would not otherwise need to be replaced
Disposal Activities Activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality	• Dredging requires specialized equipment and labor, can take several days to remove, haul and dispose sediments • Require up to 4 hours to complete hauling of grass cuttings and trash to proper disposal sites • Removal of sediments in rip-rap transported to a safe disposal site	• Improper disposal may lead to environmental damage and further expenses • Possible reputational damage for poorly coordinated disposal activities from active community groups and environmentalist

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Service Improvement Activities Planned activities to improve an asset's capacity, quality, and system reliability	• Complete asset management planning for all stormwater assets and activities **Planned for Future** • Refine cost estimates for maintenance activities by tracking and analyzing actual costs • Evaluate opportunities for improvement of the program by refining performance measures • Develop training programs for internal or external inspection • Evaluate options for contracting activities versus completing O&M activities internally	• Risks fair, equitable treatment of communities • Potential for reputation damage from ongoing flood events and associated health hazards for those impacted, especially elderly and low-income families
Growth Activities Planned activities required to extend services to previously unserved areas or expand services to meet growth demands	• Capital and Master Plan projects • Development plans for new communities	• Risks fair, equitable treatment of communities • Potential for reputation damage from ongoing flood events and associated health hazards for those impacted, especially elderly and low-income families • Potential disruption to businesses leading to a loss of interest in commercial developments due to impaired or permanently reduced income potential

Table 52 summarizes various activities and asset management practices for the Town's stormwater manholes and manhole catchbasins, along with the risks associated with the alternative do-nothing approach or practice. These lifecycle activities will be continually improved in future AMPs and are provided to guide decisions about which activities should be evaluated for various operational and capital investments, across all lifecycle stages. Without their inclusion and documentation, knowledge management issues may arise, especially related to maintaining the long-term continuity of quality services and inter-generational equity.

Table 52: Stormwater: Manholes & Catchbasins: Lifecycle Activities

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Non- Infrastructure Solutions Actions or policies that can lower costs or extend useful lives	• High quality imaging can be collected and kept on file to improve the cost-effectiveness of operational and maintenance planning **Planned for Future** • Policies that promote continued maintenance on a regular basis will extend service life and improve performance levels	• Health hazards may exist for inspectors with some routines, including activities that require confined space entry, traffic control requirements, and the possibility that recent storm events cause unexpected surcharging • Increased potential for environmental damage
Maintenance Activities Including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events	• Minor repairs (grouting, root treatment) • Aligning modular components with surface and replacing broken catch basins and manhole covers • Routine catchbasin cleaning **Planned for Future** • Inspections • Routine manhole cleaning • Flow monitoring	• Health hazards may exist for inspectors with some routines, including activities that require confined space entry, traffic control requirements, and the possibility that recent storm events cause unexpected surcharging
Renewal/ Rehab Activities Significant repairs designed to extend the life of the asset	• Repairs to various components • Grouting infiltration joints • Root treatments where required • Correcting erosion	• Potential reputational damage from users in the right of way who are disrupted by planned works or by unplanned failures
Replacement/ Construction Activities Activities that are expected to occur once an asset has reached the end of its useful life and renewal/ rehab is no longer an option	• Full replacement at end of life, typically coordinated with roadworks	• Delayed capital replacement activities can accelerate the deterioration of components that would not otherwise need to be replaced

Activity Type	Asset Management Practices	Potentially Mitigated Outcomes
Disposal Activities Activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality	• Dewatering, and appropriate disposal • Removal of sediments to an appropriate and safe disposal site • Recycling of metallic components as able	• Improper disposal may lead to environmental damage and further expenses • Possible reputational damage for poorly coordinated disposal activities from active community groups and environmentalist
Service Improvement Activities Planned activities to improve an asset's capacity, quality, and system reliability	• Complete asset management planning for all stormwater assets and activities **Planned for Future** • Refine cost estimates for maintenance activities by tracking and analyzing actual costs • Evaluate opportunities for improvement of the program by refining performance measures • Develop training programs for internal or external inspection • Evaluate options for contracting activities versus completing O&M activities internally	• Risks fair, equitable treatment of communities • Potential for reputation damage from ongoing flood events and associated health hazards for those impacted, especially elderly and low-income families
Growth Activities Planned activities required to extend services to previously unserved areas or expand services to meet growth demands	• Capital and Master Plan projects • Development plans for new communities	• Potential for reputation damage from ongoing flood events and associated health hazards for those impacted, especially elderly and low-income families

Table 53 summarizes various activities and asset management practices for the Town's stormwater oil/grit separators, along with the risks associated with the alternative do-nothing approach or practice. These lifecycle activities will be continually improved in future AMPs and are provided to guide decisions about which activities should be evaluated for various operational and capital investments, across all lifecycle stages. Without their inclusion and documentation, knowledge management issues may arise, especially related to maintaining the long-term continuity of quality services and inter-generational equity.

Table 53: Stormwater: Oil/Grit Separators: Lifecycle Activities

Activity Type	Asset Management Practices	Potentially Mitigated Risks
Non- Infrastructure Solutions Actions or policies that can lower costs or extend useful lives	• Policies that prioritize continued maintenance on a regular basis will extend service life and improve performance levels **Planned for Future** • Continual improvement frameworks that collect data on designs, plans and strategies with the objective to improve assets and services with front-line staff	• Health hazards may exist for inspectors with some routines, including activities that require confined space entry, traffic control requirements
Maintenance Activities Including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events	• Annual inspections • Cleaning activities • Removing sediment buildup	• Health hazards may exist for inspectors with some routines, including activities that require confined space entry, traffic control requirements
Renewal/ Rehab Activities Significant repairs designed to extend the life of the asset	• Major redesign or upgrade to components that manage inlet and outlet flows	• Potential reputational damage from users in the right of way who are disrupted by planned works or by unplanned failures
Replacement/ Construction Activities Activities that are expected to occur once an asset has reached the end of its useful life and renewal/ rehab is no longer an option	• Replacement of the asset or asset components once its life cannot be extended through maintenance activities	• Delayed capital replacement activities can accelerate the deterioration of components that would not otherwise need to be replaced
Disposal Activities Activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality	• Disposal of damaged and decayed assets • Proper disposal of oil/grit sediment buildup	• Improper disposal may lead to environmental damage and further expenses • Possible reputational damage for poorly coordinated disposal activities from active community groups and environmentalist

Activity Type	Asset Management Practices	Potentially Mitigated Risks
Service Improvement Activities Planned activities to improve an asset's capacity, quality, and system reliability	• Complete asset management planning for all stormwater assets and activities **Planned for Future** • Refine cost estimates for maintenance activities by tracking and analyzing actual costs • Evaluate opportunities for improvement of the program be refining performance measures • Develop training programs for internal or external inspection • Evaluate options for contracting activities versus completing O&M activities internally	• Potential impacts to stormwater system capacity and quality, leading to increased damage from inadequate stormwater management • Loss of institutional knowledge related to how to maintain cost-effective service reliability
Growth Activities Planned activities required to extend services to previously unserved areas or expand services to meet growth demands	• Capital and Master Plan projects • Development plans for new communities	• Potential for reputation damage from ongoing flood events and associated health hazards for those impacted, especially elderly and low-income families

7.2 FORECASTED LIFECYCLE ACTIVITY COSTS

The following long-term investment forecast for Stormwater uses a 100-year horizon to illustrate the capital and operational needs across the entire asset lifecycle from creation to disposal. The Town has a prudent financial process, but commonly maintenance activities are reflected as operating costs, while renewal and replacement activities are reflected in capital costs. Figure 26 illustrates the annual investment requirements for the Town's Stormwater asset portfolio over 100 years, without additional assets from planned development. The Stormwater infrastructure backlog is estimated to be approximately $13 million in 2021. This represents the replacement value of the assets that are operating beyond their intended life which may include assets in a "run to failure" mode of operation (for example, an industrial road with very low traffic).

The following long-term investment forecast for Transportation uses a 100-year horizon to illustrate the capital and operational needs across the entire asset lifecycle from creation to disposal. Note that the following forecast does not include land assets in the analysis. Costs are based on recent tenders, condition assessments, studies with asset valuation assessments, and outputs from various accounting practices that are required for tangible capital assets. No inflation was applied to capital or operating costs.

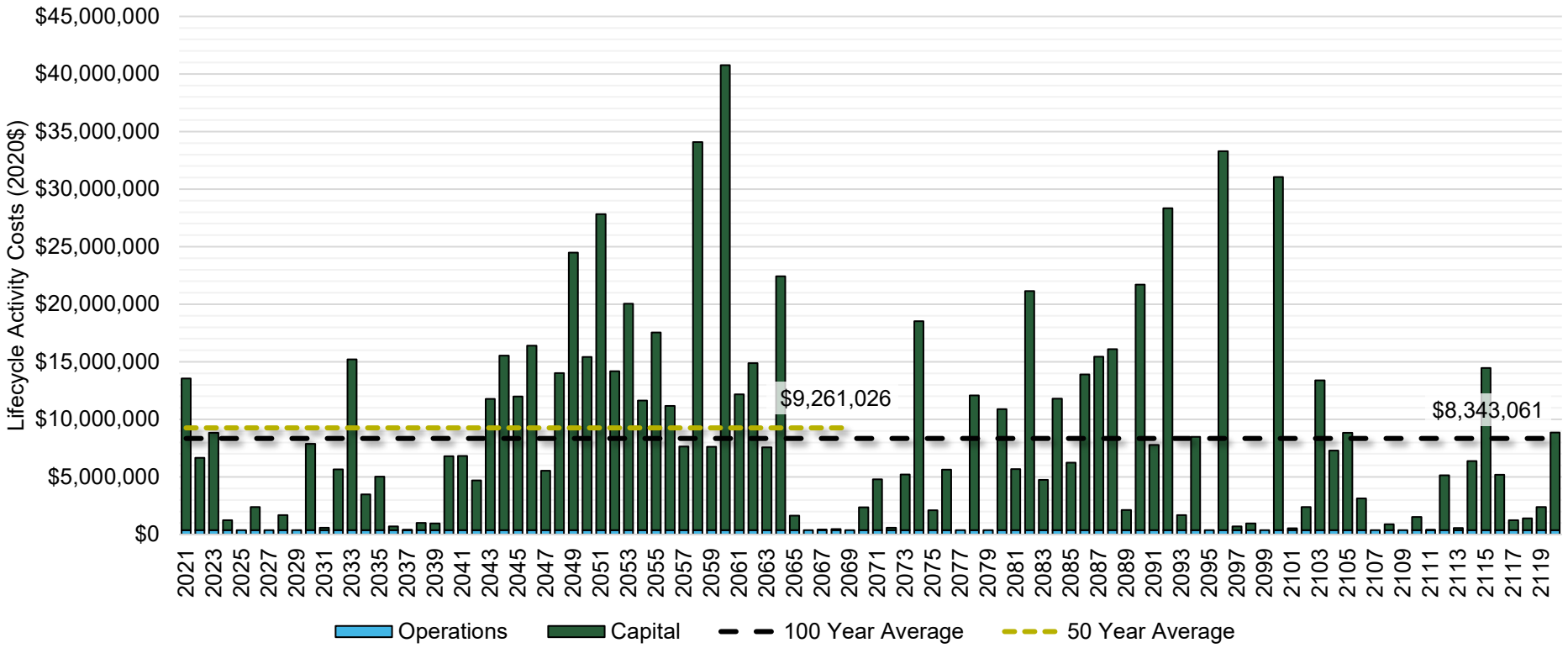


Figure 26: Forecasted Lifecycle Activity Costs - 100 Year Projection

8 Financial Strategy

8.1 INTRODUCTION

This chapter integrates previous information on asset valuations, condition, levels of service, performance trends, lifecycle activities, and expected growth patterns to establish the long-term investment levels that are required to sustain the Town's infrastructure systems and the services they support. Funding for these investment needs are determined on a project-by-project basis, with one or more of the following strategies:

- **Pay as you go:** Saving all funds in advance of building or acquiring an asset. This strategy is long range in nature and sometimes requires foregoing needs in the short term until enough capital has been saved to carry out the required project.
- **Reserve Accounts:** Contributing revenues to a reserve account and drawing funds from the account. This strategy allows a reserve 'threshold' to be set to provide a buffer for unexpected expenditures. It also allows lifecycle contributions to be made on an annual basis which can be drawn upon when needed.
- **Debenture Financing:** A loan issued to the organization for building or acquiring an asset, which involves repayment annually with interest. The Province has limits on the total amount of debt which is based on an annual payment limit or 25 per cent of the municipality's source revenue.
- **Third-Party Contributions:** Contributions from parties external to the organization. This typically comes from contributions, subsidies and recoveries from development or grants from senior levels of government. This funding strategy impacts rates (except in the case of grants and subsidies).
- **User Fees:** Rates charged to the users of a service, which is typically based on a full cost recovery model

To ensure fiscal responsibility and stable service environment for residents, businesses, and visitors, the Town uses short- and long-term analyses to continually improve the sustainability of capital plans and financial strategies. These include 100-year sustainability forecasts, 10-year capital budgets, and reserve fund forecasts.

8.2 CAPITAL BUDGETS

This first section of the Financial Strategy describes the overall funding available in the past for asset renewals and replacements. Historical asset renewals and replacements were fully funded from reserves & reserve funds, grants, debentures, recoveries, and contribution from operating. In the future, the Town intends to reduce funding by debentures and plans to use it for facility asset renewals only.

Information presented in Table 54 represents the Town's capital investments, organized by asset type. This level of investment reflects the current lifecycle phase for most asset types, which are generally in a new or recently constructed stage, as the Town is a relatively new and rapidly growing municipality. As these assets and systems continue to age, additional investment will be required to enable the Town to deliver current levels of service to the community. The following sections will forecast the effects to asset condition at various levels of investment.

Table 54: Annual Capital Investments in Existing Assets, Excluding Growth

Asset Type	2015 Actuals	2016 Actuals	2017 Actuals	2018 Actuals	2019 Actuals
Roads & ROW	$4,261,888	$7,963,171	$7,473,836	$8,705,517	$10,916,683
Structures	$0	$308,664	$990,607	$2,978,641	$1,002,042
Traffic	$184,486	$478,329	$301,462	$877,539	$1,933,575
Stormwater	$238,615	$878,946	$817,801	$441,932	$744,114
Total	$4,684,989	$9,629,110	$9,583,706	$13,003,629	$14,596,414

(minor differences due to rounding)

8.3 SUSTAINING THE EXISTING ASSET PORTFOLIO

The following long-term investment forecasts use a 100-year horizon to illustrate the capital and operational needs across the entire asset lifecycle from creation to disposal and includes contingency, design, and project management costs. The purpose of providing these forecasts is to inform decision makers about the costs to maintain current levels of service, whereas costs to maintain future or desired levels of service will be included in future iterations of the Town's Corporate AM Plan.

For example, infrastructure systems constructed in the 1990's with an expected service life of 50-years will require investments before 2040. If those investment requirements are not addressed appropriately, current levels of service could potentially decline while the cost of operations and maintenance increase. The following 100-year forecasts aim to cover the entire lifecycle of the Town's assets to identify these trends.

Figure 27 illustrates the annual capital investment requirements for the Town's entire asset portfolio, without additional assets from planned development. No budget is used in the figure to limit spending which means that work is completed as soon as the asset condition reaches a level that triggers a lifecycle activity, which in some cases may be when the asset reaches poor or very poor condition. This figure shows that on average, assuming unlimited financial resources, the Town will need to invest approximately $69 million per year to accommodate all lifecycle requirements described in the previous chapters, over 100-years for all asset types in this plan.

It is important to note that the infrastructure backlog is estimated to be approximately $126 million in 2021 (see Figure 27). This represents the replacement value of the assets that are operating beyond their expected service life. However, this backlog may be overstated as assets can continue to function past their estimated service life, particularly for assets in a "run to failure" mode of operation (for example, an industrial road with very low traffic). It is not expected that the Town will complete work at this scale, however, the scenario is meant to provide an understanding of overall infrastructure needs to allow the Town to plan and budget for addressing these needs over time.

Figure 27 also shows which years have higher investment needs, from 2052-2054 and from 2089-2091. These spikes represent the replacement of large assets with high replacement values, and groups of assets that require rehabilitation or replacement at the same time. These needs reflect the Town's recent and rapid expansion over a relatively short time period, earning its title as one of Canada's fastest growing municipalities.

Note that the following forecast does not include land assets in the analysis. Costs are based on recent tenders, condition assessments, studies with asset valuation assessments, and outputs from various accounting practices that are required for tangible capital assets. No inflation was applied to capital or operating costs.

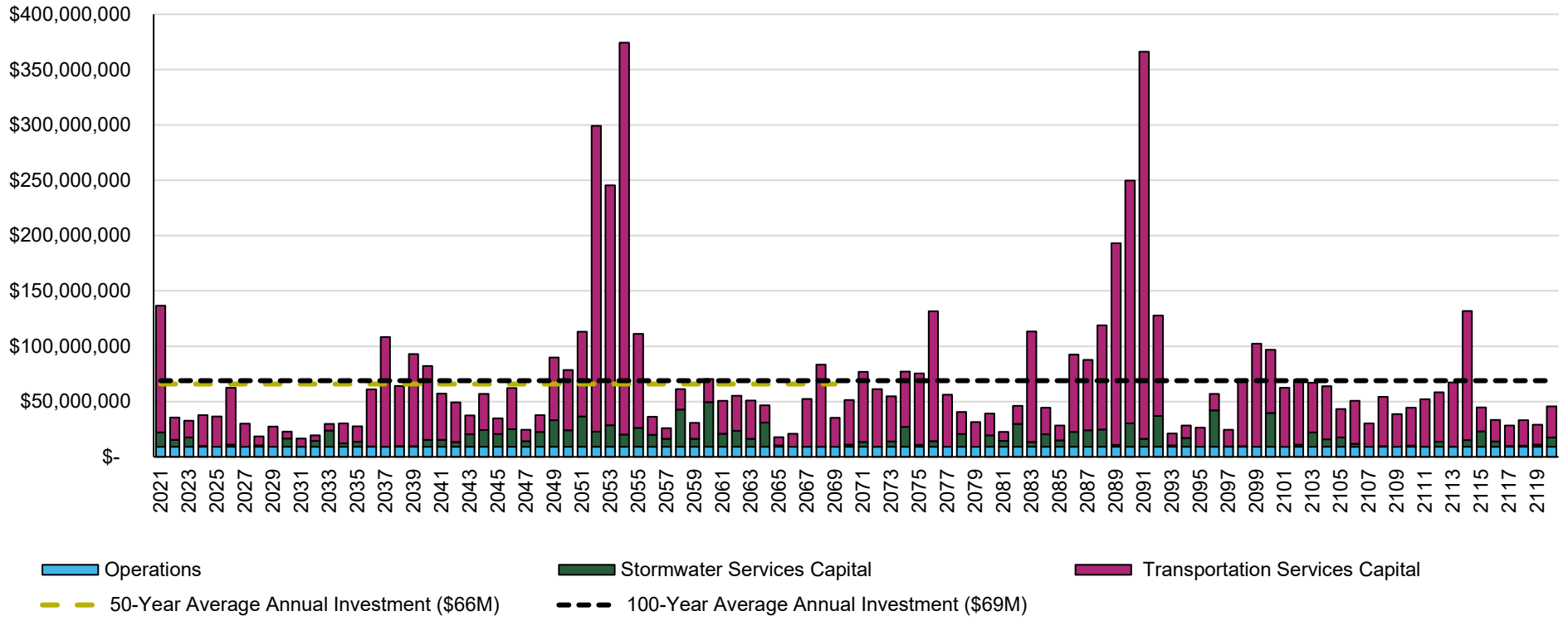


Figure 27: Long-Term Expenditure Forecast, Existing Assets, Unlimited Budget Scenario (2020$)

Without budget constraints, this scenario prioritized asset renewals in the most effective year based on established lifecycle strategies. The resulting effect on asset condition is illustrated in Figure 28 for Transportation Services, and in Figure 29 for Stormwater Services. Both Transportation and Stormwater assets maintain an expected average condition of 72 over the next 100 years. These numbers are included for reference as any changes to the targeted levels of service will affect the overall risk and condition profile for the Town's infrastructure systems.

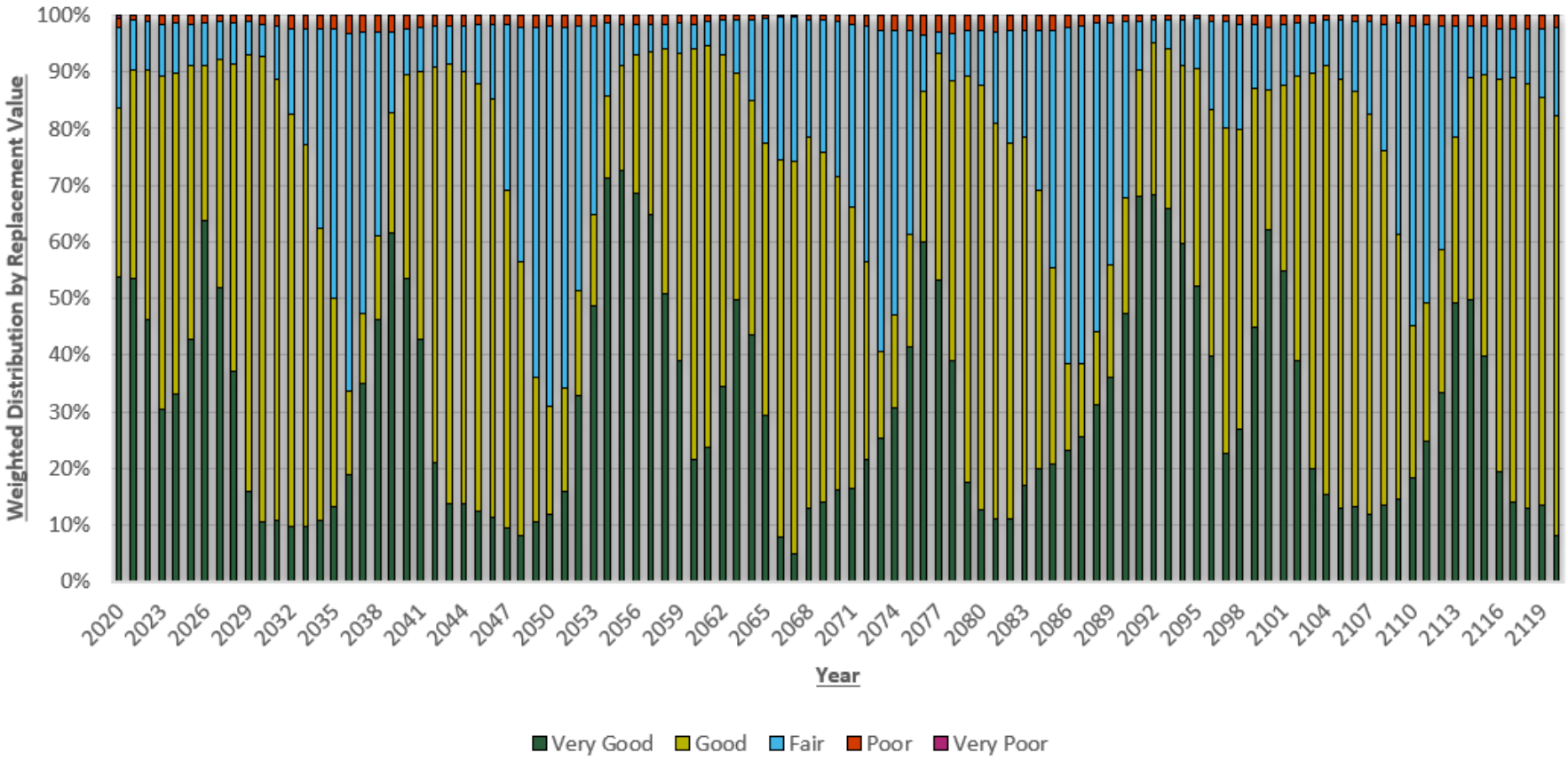


Figure 28: Long-Term Condition Forecast, Unlimited Budget Scenario, Transportation Services, Existing Assets

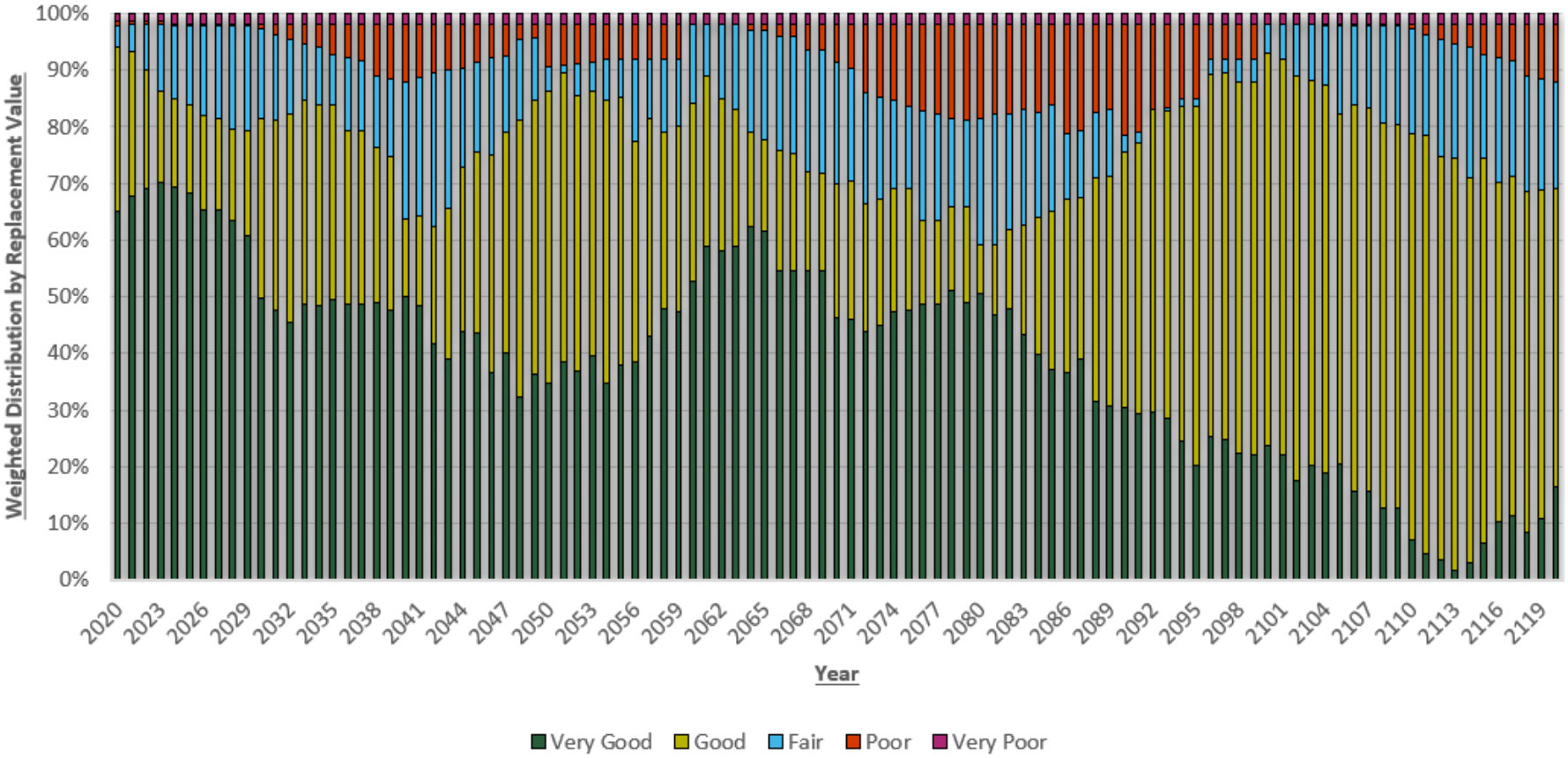


Figure 29: Long-Term Condition Forecast, Unlimited Budget Scenario, Stormwater Services, Existing Assets

8.4 SUSTAINING THE CURRENT ASSET PORTFOLIO WITH GROWTH PLANS

Beyond the infrastructure currently built today, the Town of Milton has and will continue to grow at a rapid pace. Figure 30 illustrates the investment requirements for the Town's existing assets, with the growth in infrastructure defined by the Town's development plans included. These new assets were added based on the 2017 fiscal impact study up to 2036, beyond that timeline no additional growth assets have been assumed. This is recommended to be revisited in future AMP.

Figure 30 shows that on average, the Town will need to invest approximately $108 million per year to accommodate all lifecycle requirements over the next 100-years for both Transportation Services and Stormwater Services. It is important to note that the infrastructure backlog is estimated to be approximately $126 million in 2021. Figure 30 also shows which years have much higher investment needs, specifically in 2052-2054 and 2089-2092. Note that the following forecast does not include land assets. As before, costs are based on recent tenders, condition assessments, studies with asset valuation assessments, and outputs from various accounting practices that are required for tangible capital assets. An inflationary rate of 1.75% was applied to operational salaries and 2.12% was applied to the remaining operational budget totaling $9 million per year in 2020. No inflation was applied to capital costs.

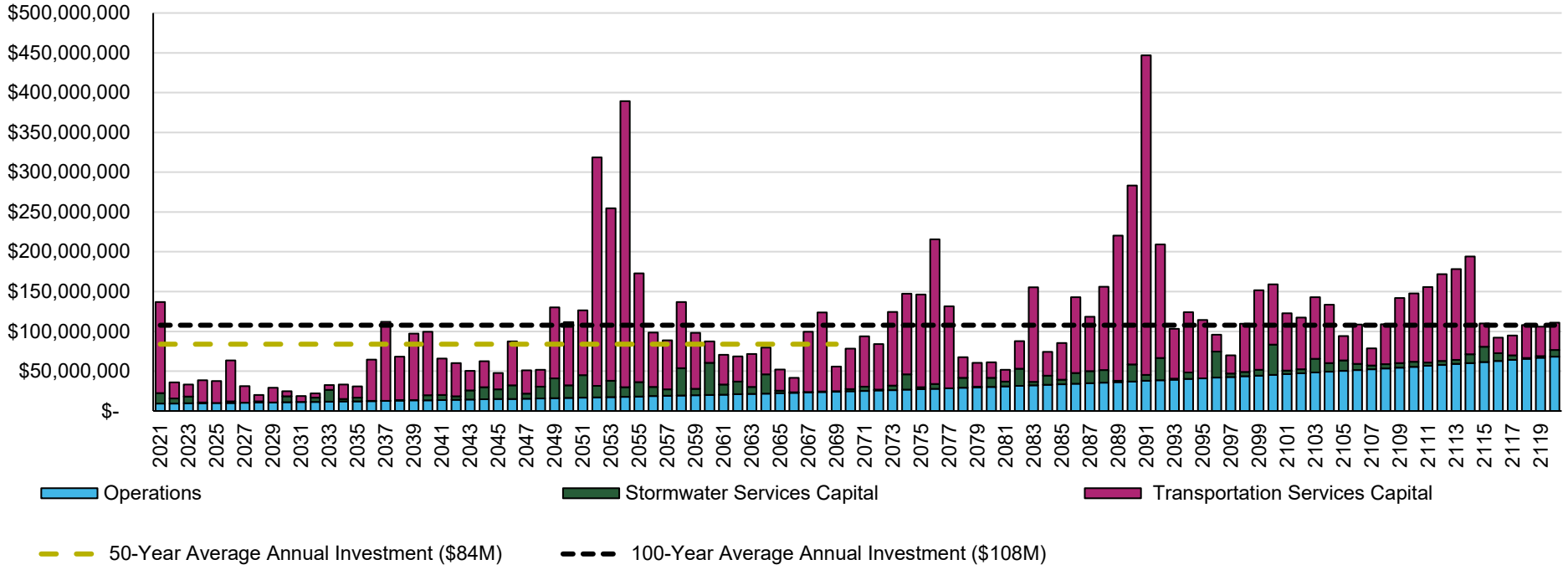


Figure 30: Long-Term Expenditure Forecast, Existing Assets and Asset Growth Forecast, Unlimited Budget Scenario (2020$)

Without budget constraints, this scenario prioritized asset renewals in the most effective year based on established lifecycle strategies. The resulting effect on asset condition is illustrated below in Figure 31 for all assets in Transportation Services, and in Figure 32 for all assets in Stormwater Services. Over the 100-year horizon, Transportation assets maintain an average condition of 74, whereas Stormwater assets have an average condition of 71. These numbers are included for reference as any changes to the lifecycle strategies will affect the overall risk and condition profile for the Town's infrastructure systems.

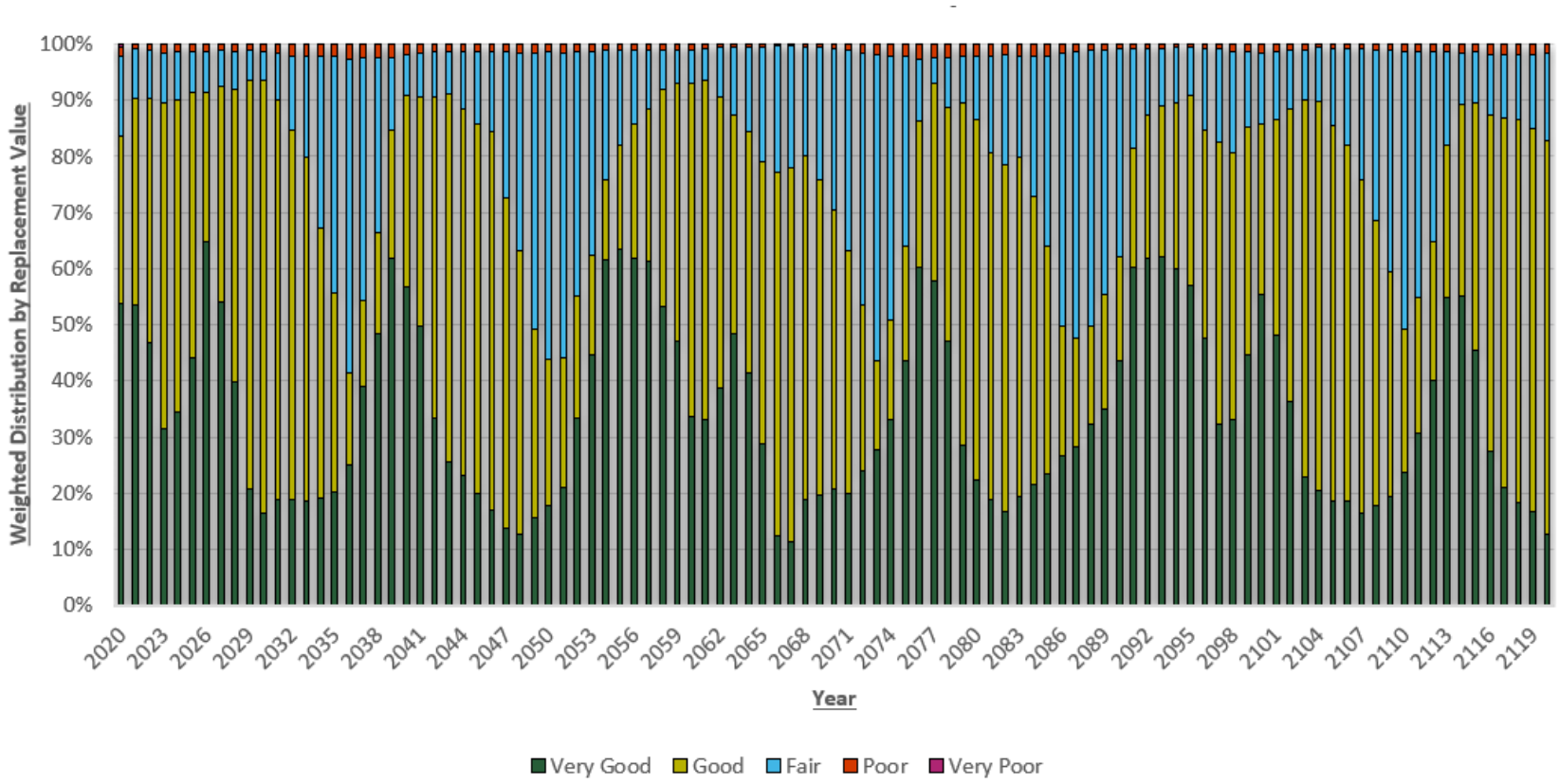


Figure 31: Long-Term Condition Forecast, Unlimited Budget Scenario, Transportation Services, Existing and Growth Assets

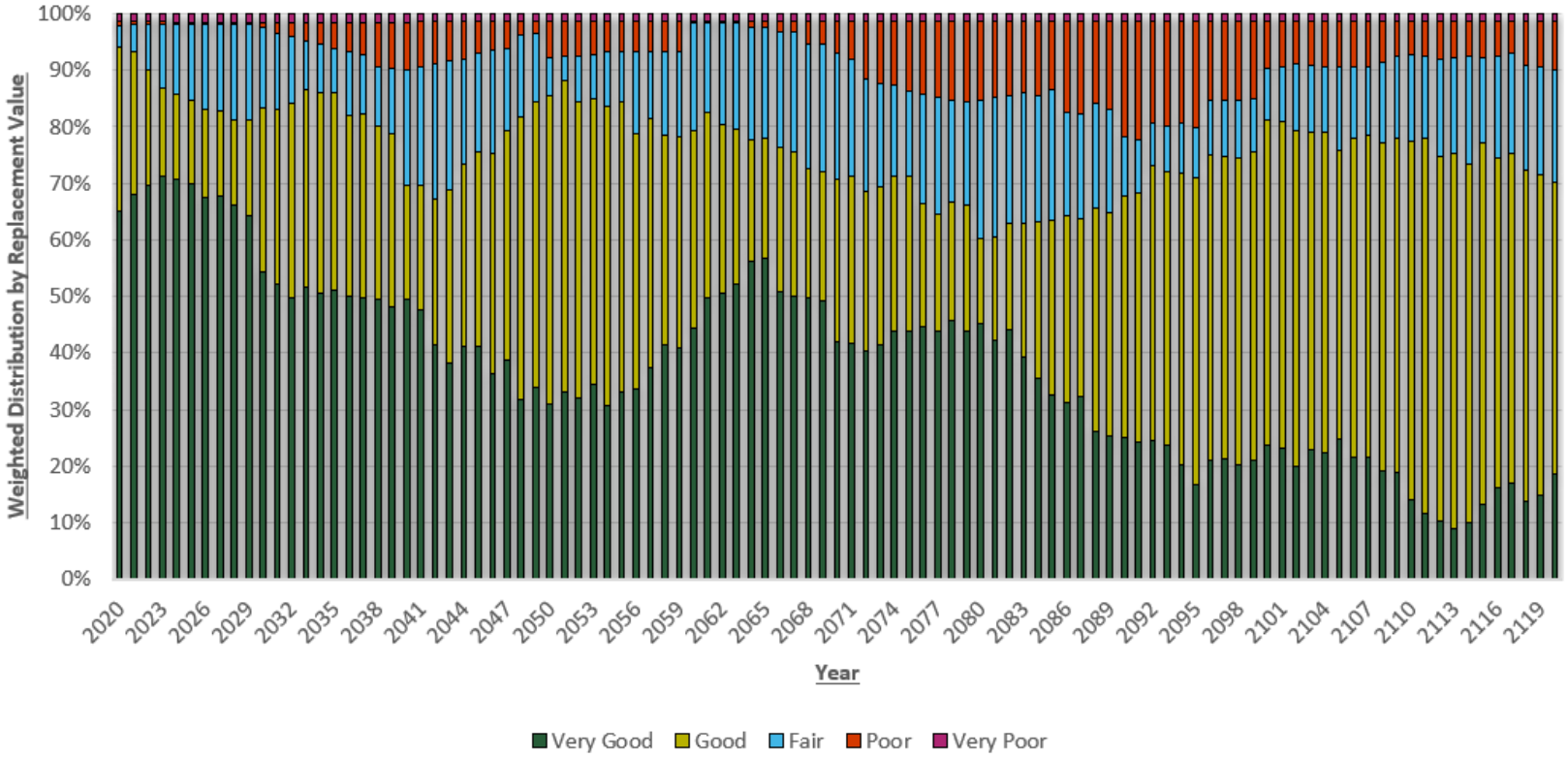


Figure 32: Long-Term Condition Forecast, Unlimited Budget Scenario, Stormwater Services, Existing and Growth Assets

8.5 THE EXPECTED IMPACTS OF CURRENT BUDGET LEVELS

While the previous financial forecasts were developed with an unlimited budget to determine the average annual asset investment required to sustain the Town's current and future assets, this section provides information on the expected impacts from current investment levels. The scenario budgets in Table 55 are based on the 10-year forecast of reserves and reserve funds dedicated for core assets. An inflationary rate of 1.75% was applied to operational salaries and 2.12% was applied to the remaining operational budget totaling $9 million per year in 2020. No inflation was applied to capital costs.

Table 55: Forecasted Capital Investment Growth Scenario Budget ('000)

Service Area	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Transportation	$13,195	$14,128	$15,989	$18,414	$20,355	$23,355	$25,385	$28,331	$30,971	$32,426
Stormwater	$2,108	$2,433	$2,796	$3,100	$3,394	$3,712	$4,049	$4,397	$4,753	$4,902
Total	$15,304	$16,561	$18,786	$21,515	$23,750	$27,067	$29,435	$32,729	$35,724	$37,328

(minor differences due to rounding)

For forecasting beyond the next 10 years, several assumptions were made as outlined below:

- An annual increase of $1M to infrastructure renewal transfer is assumed based on the current 10-year forecast (75% to Transportation and 5% to Stormwater), until the target reserve balance is reached ($282,249,000 for Roads and $20,754,000 for Stormwater).
- For growth assets, additional funds were added to the budget and the target reserve balance was increased the year of commissioning based on the annual amortization of the new assets.
- The Ontario Lottery Proceeds (OLG) are used for both core and non-core assets, with 20% historically going to core assets (15% to Transportation and 5% to Stormwater). While this assumption is used for the current projection, this allocation percentage is not fixed and can be subject to change.
- It is assumed that the funding level from OLG is kept flat at $5 million after year 10 as there is no information available to determine whether growth would influence OLG to increase their contribution to the Town.

As can be seen in Figure 33, the forecasted budget will result in an average investment of $67 million per year over the next 50 years which reflects the capital projects required to renew or replace the Town's existing and anticipated growth capital assets. The overall effect on asset consumption patterns is illustrated in Figure 34 and in Figure 35.

Financial Strategy

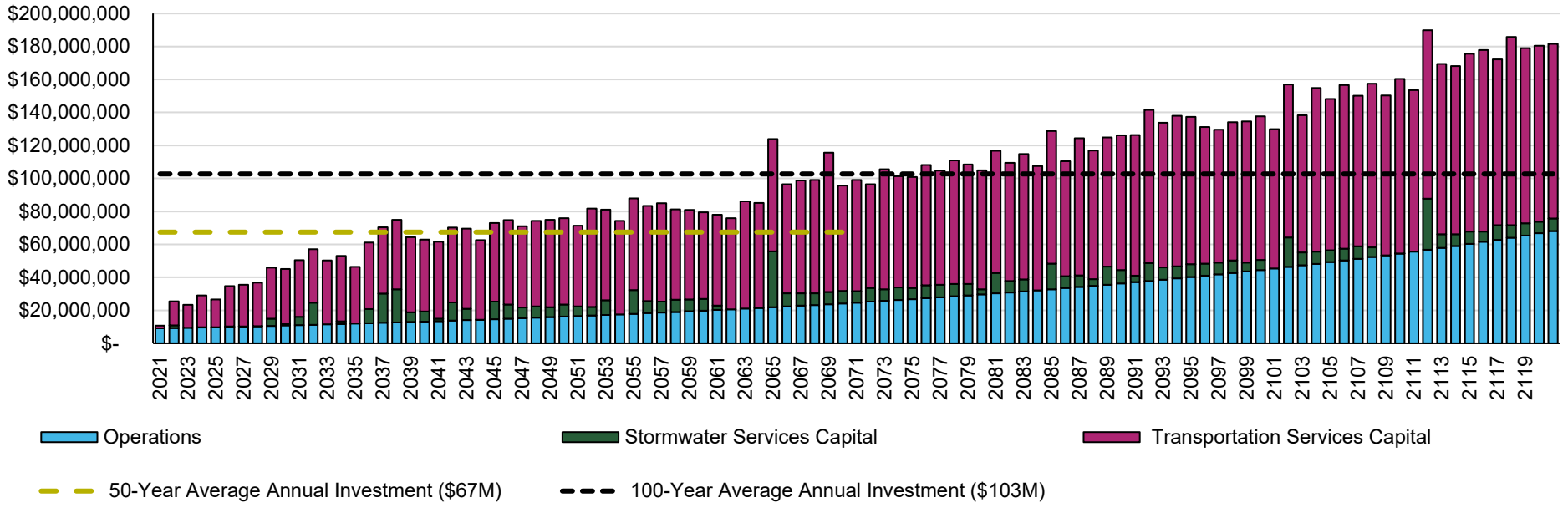


Figure 33: Long-Term Expenditure Forecast, Existing Assets and Asset Growth Forecast, Scenario Budget Level (2020$)

The overall condition profile for Transportation Services is shown in Figure 34, as well as the Stormwater Services in Figure 35 which shows that stormwater assets start deteriorating after 2030. Without adequate investment levels to sustain the asset portfolios and levels of service, assets in very good condition slowly drop to good condition year over year, and the proportion of assets in fair, poor, and very poor condition increases. Over the next 100 years, the average condition of Transportation assets will be 69, whereas Stormwater assets will be reduced to 61. This forecast suggests the current levels of funding will not be adequate to maintain the Town's intended levels of service.

Weighted by replacement value, newer Transportation assets currently in very good condition are reduced to less than 30% of the portfolio by 2046. Transportation assets with a poor or very poor condition score account for less than 20% of the portfolio today, however, this number grows to around 40% of the portfolio by 2030.

Weighted by replacement value, newer Stormwater assets currently in very good condition are reduced to around 10% of the portfolio by 2055.. Stormwater assets currently in very poor condition account for over 20% of the asset portfolio by 2071, weighted by replacement value.

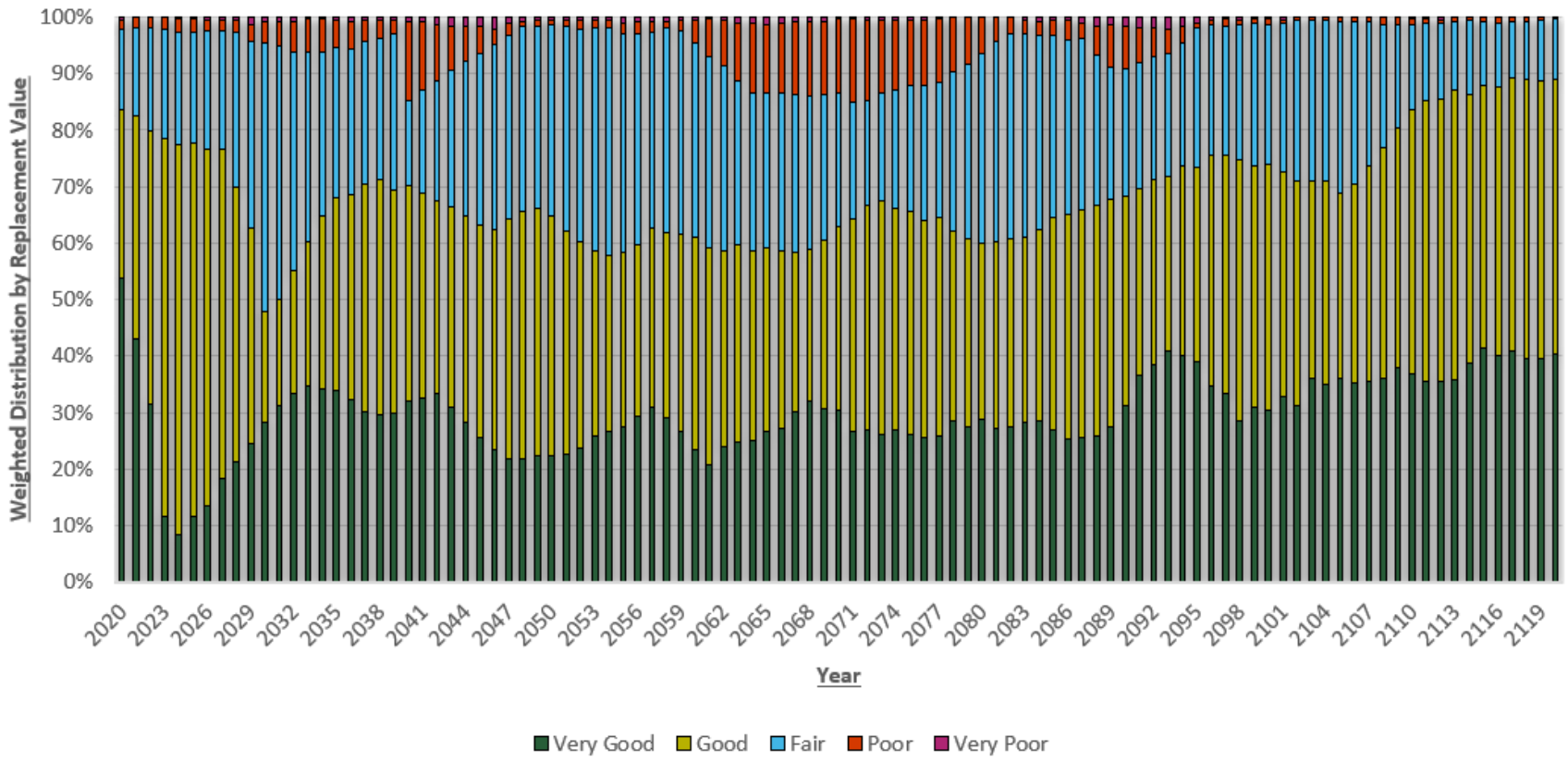


Figure 34: Long-Term Condition Forecast, Current Budget Level Scenario, Transportation Services, Existing and Growth Assets

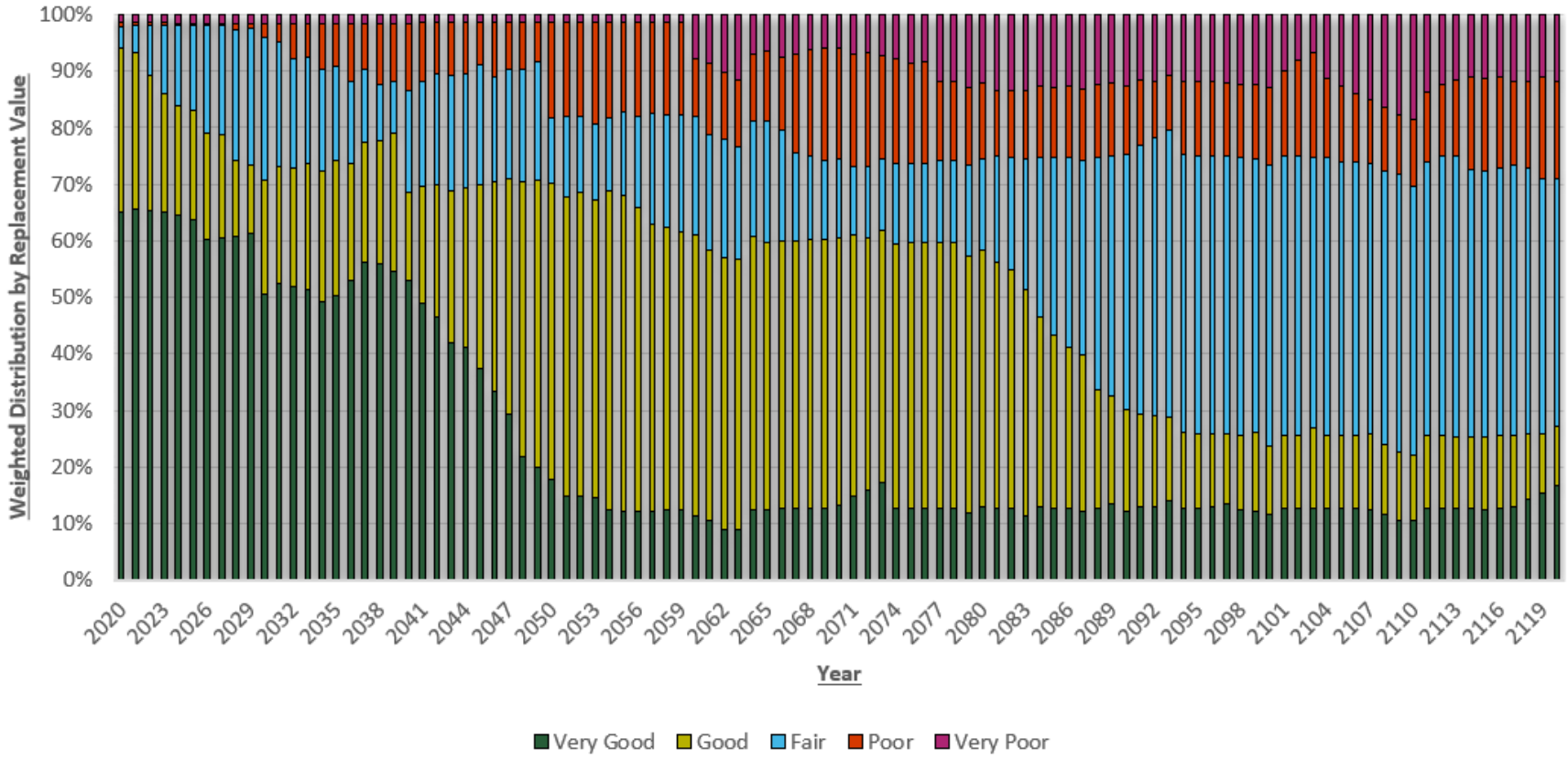


Figure 35: Long-Term Condition Forecast, Current Budget Level Scenario, Stormwater Services, Existing and Growth Assets

8.6 CONCLUSION

The preceding figures represent the levels of investment needed to maintain, replace, and rehabilitate the Town's Transportation and Stormwater assets. All costs are order of magnitude estimates only and are based on cost data provided by the Town. The figures represent the long-term funding needs at a corporate level for each service area. The financial analysis indicates that the Town needs to be reinvesting the following amounts in Table 56 on an annual basis to sustain both its existing asset portfolio over the long-term (100 years), and with current development plans.

Table 56: Comparison of Past Capital Expenditures to Sustainable Investment Levels ('000)

Service Area	Past Annual Expenditures		Forecasted Annual Sustainable Renewal Amount	
	2018	2019	Existing Portfolio	Existing Portfolio + Growth Forecast
Transportation	$12,562	$13,852	$54,804	$69,200
Stormwater	$442	$744	$7,973	$9,267
Total	$13,004	$14,596	$62,777	$78,467

While the numbers in Table 56 are large, the Town has continually improved its approach to asset management planning by collecting data for evidence-based funding decisions. For example, in recent years as new information was developed about the costs related to sustaining levels of service, the Town significantly increased its annual capital investments in existing assets.

This needs-based approach to budgeting demonstrates a prudent and proactive approach to managing the long-term costs associated with sustaining these infrastructure systems. The Town has also recently redesigned its infrastructure reserves to accommodate for the expected pressures related to future infrastructure management needs to avoid negative impacts to the Town's fiscal position.

The information presented below in Figure 36 illustrates the cumulative effect of the non-growth infrastructure investments with the backlog spread across a 20 year period, compared to the cumulative funding available for these investments. Figure 37 to Figure 40 demonstrate the 20 year non-cumulative funding compared to non-growth and growth operating and capital funding requirements. As can be seen in Figure 36 the current funding levels do not meet the cumulative investment requirements and without funding increases the cumulative deficit in funding for capital requirements in 20 years could grow to $200 million. After spreading the infrastructure backlog across a 20-year period, an annual increase of 7.5% to current funding levels was found to meet the total investment requirements. However, Figure 37 demonstrates that the Town's current plan to increase the non-growth budget by $1 million per year would meet the non-cumulative 10 year average annual funding requirements by 2032 for existing assets.

For these reasons the Town may want to consider the utilization of a separate stormwater rate structure as has been adopted in several other municipalities. Such a strategy would allow for a distribution of cost that considers property characteristics that relate to the need for stormwater services through a new revenue stream. For example, industrial and commercial operations with large paved parking lots may pay a larger share for

stormwater services, because the paved surfaces increase the surface water runoff that the Town's stormwater system must manage, especially as larger and more frequent storms are experienced from climate change.

Completion of this asset management plan is also an important step towards understanding the funding required to maintain these infrastructure systems. And both the Federal and Provincial governments continue to support infrastructure investments with special grants and programs. For example, the Federal Government recently launched the Disaster Mitigation and Adaptation Fund through Infrastructure Canada to support large-scale infrastructure projects that help manage the risk of weather-related events including floods, fires, and droughts.

In addition to adopting new approaches to funding capital programs, technology advancements will also play an important role in maintaining the Town's community infrastructure systems. Ongoing innovations like LED streetlights deliver current levels of service with lower lifecycle costs. Material science innovations continue to produce assets with longer lives, and new technologies that line stormsewers can delay their replacement costs while extending their service life. Further information in future iterations of the Town's CAM Plan will continue to explore the range of potential and piloted options that the Town invests in to maintain a high quality of life for its residents, visitors, and businesses.

Financial Strategy

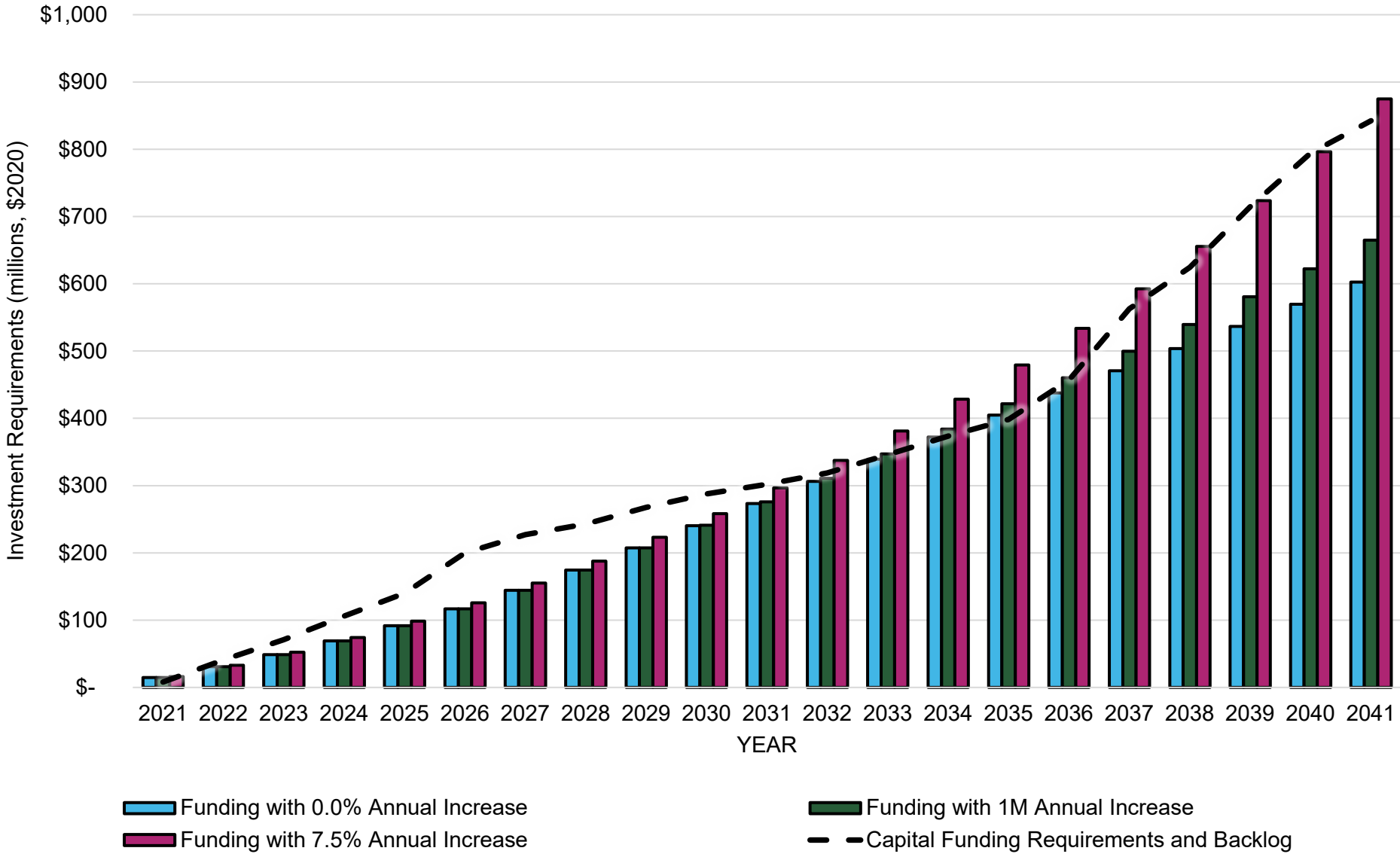


Figure 36: 20-Year Cumulative Capital Investments vs. Revenues (millions, 2020$)

Financial Strategy

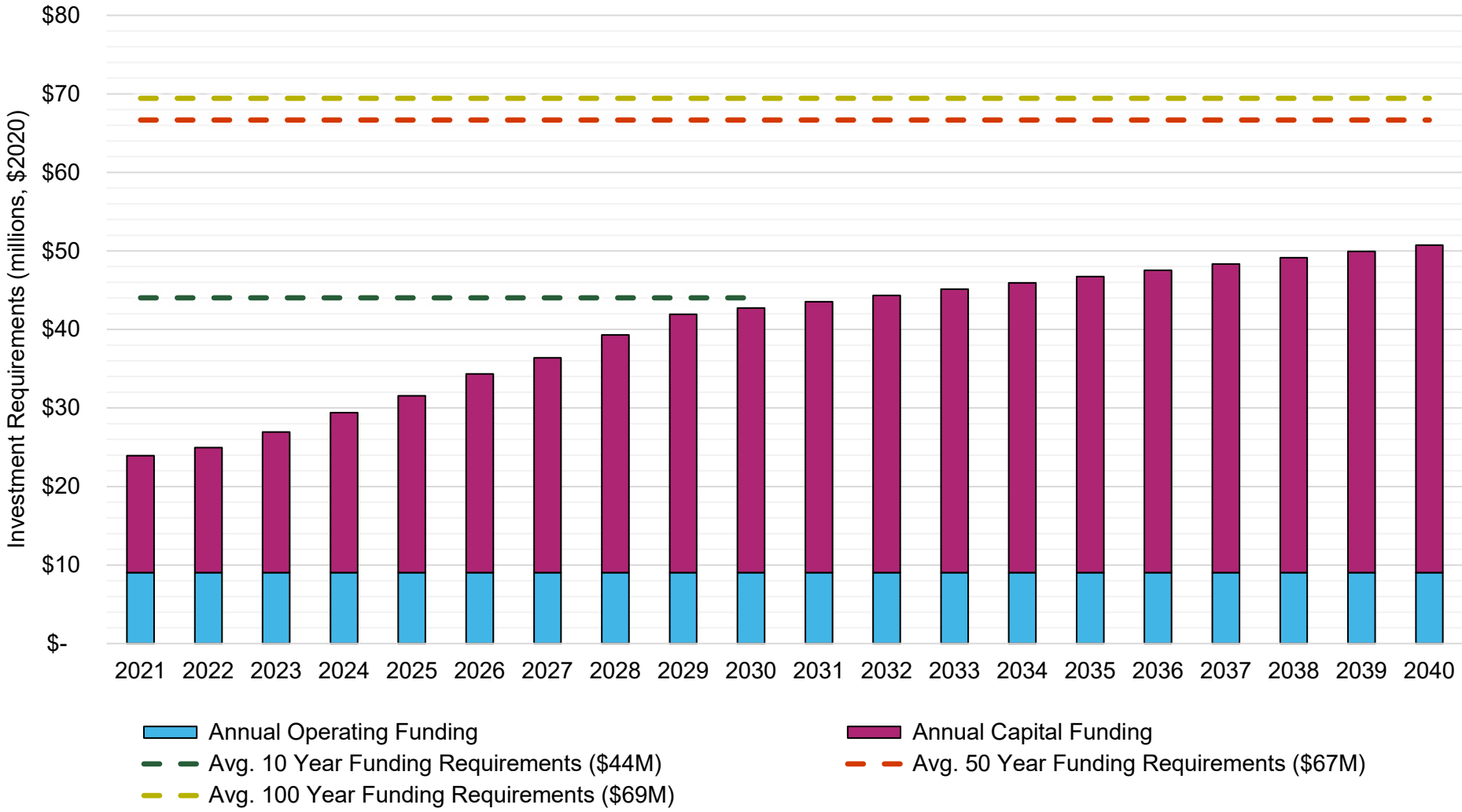


Figure 37: Non-Growth Infrastructure Financing to Lifecycle Funding Requirements – Capital & Operating (millions, 2020$)

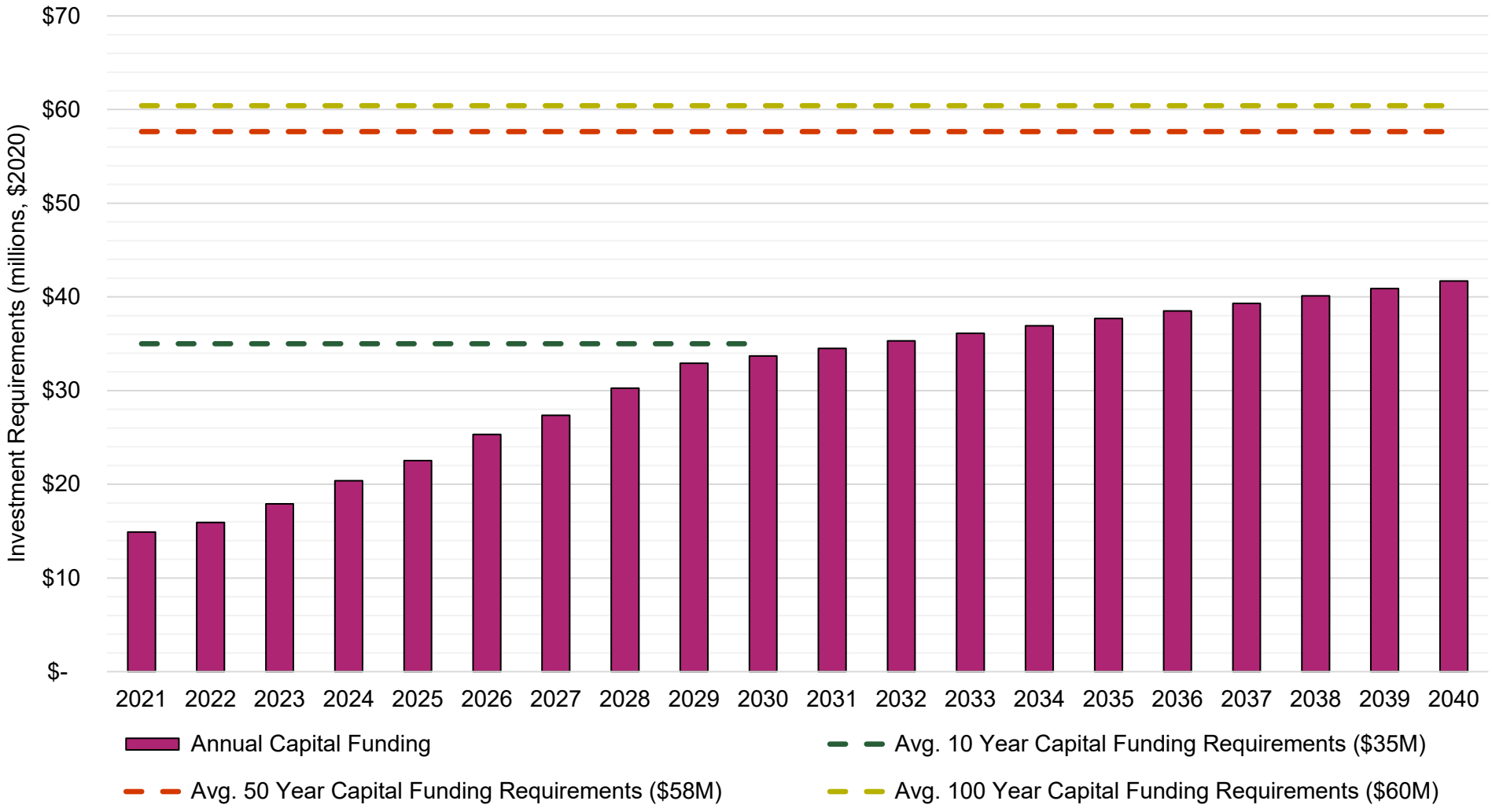


Figure 38: Non-Growth Infrastructure Financing to Lifecycle Funding Requirements – Capital (millions, 2020$)

Financial Strategy

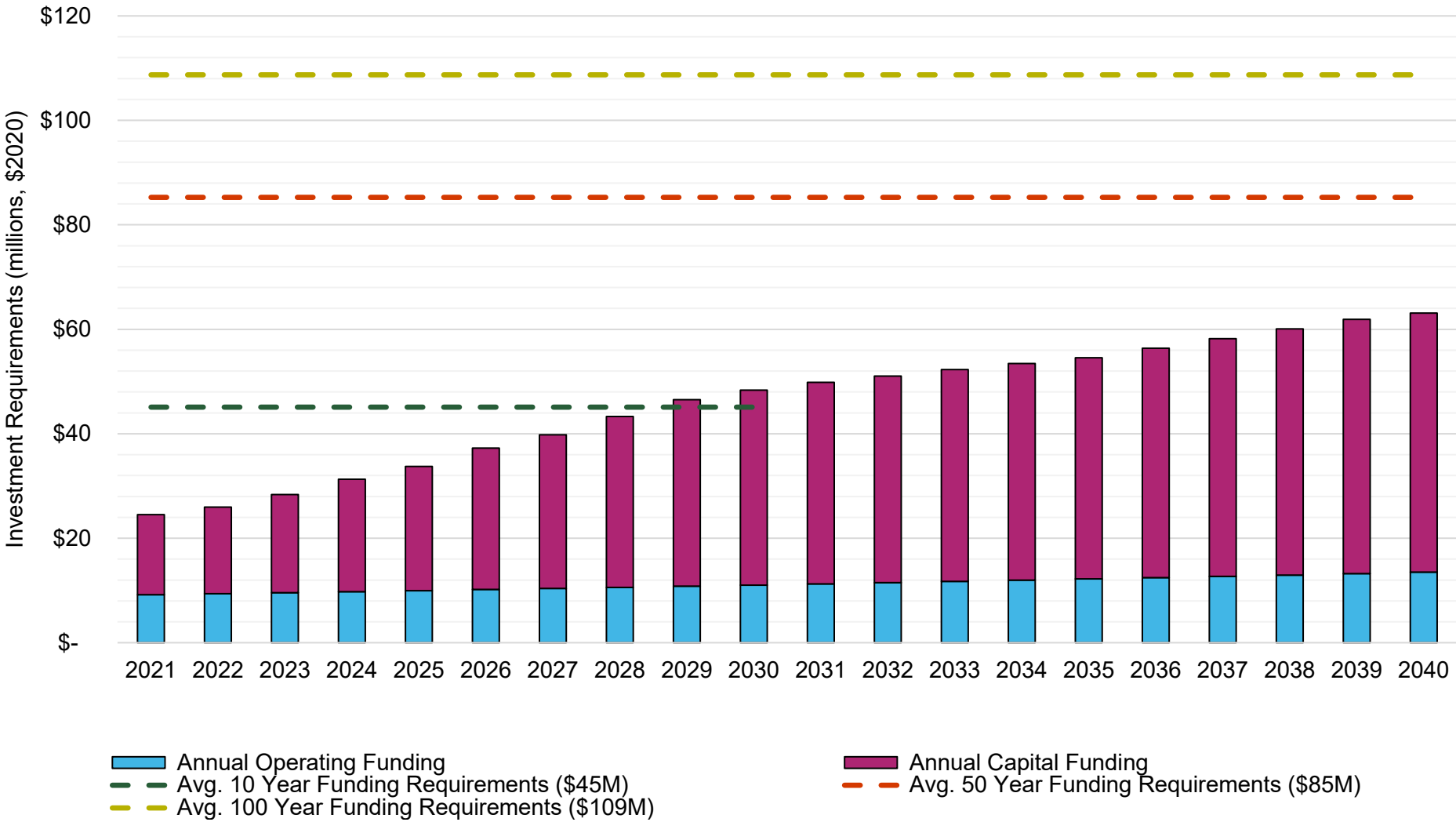


Figure 39: Growth Infrastructure Financing to Lifecycle Funding Requirements – Capital & Operating (millions, 2020$)

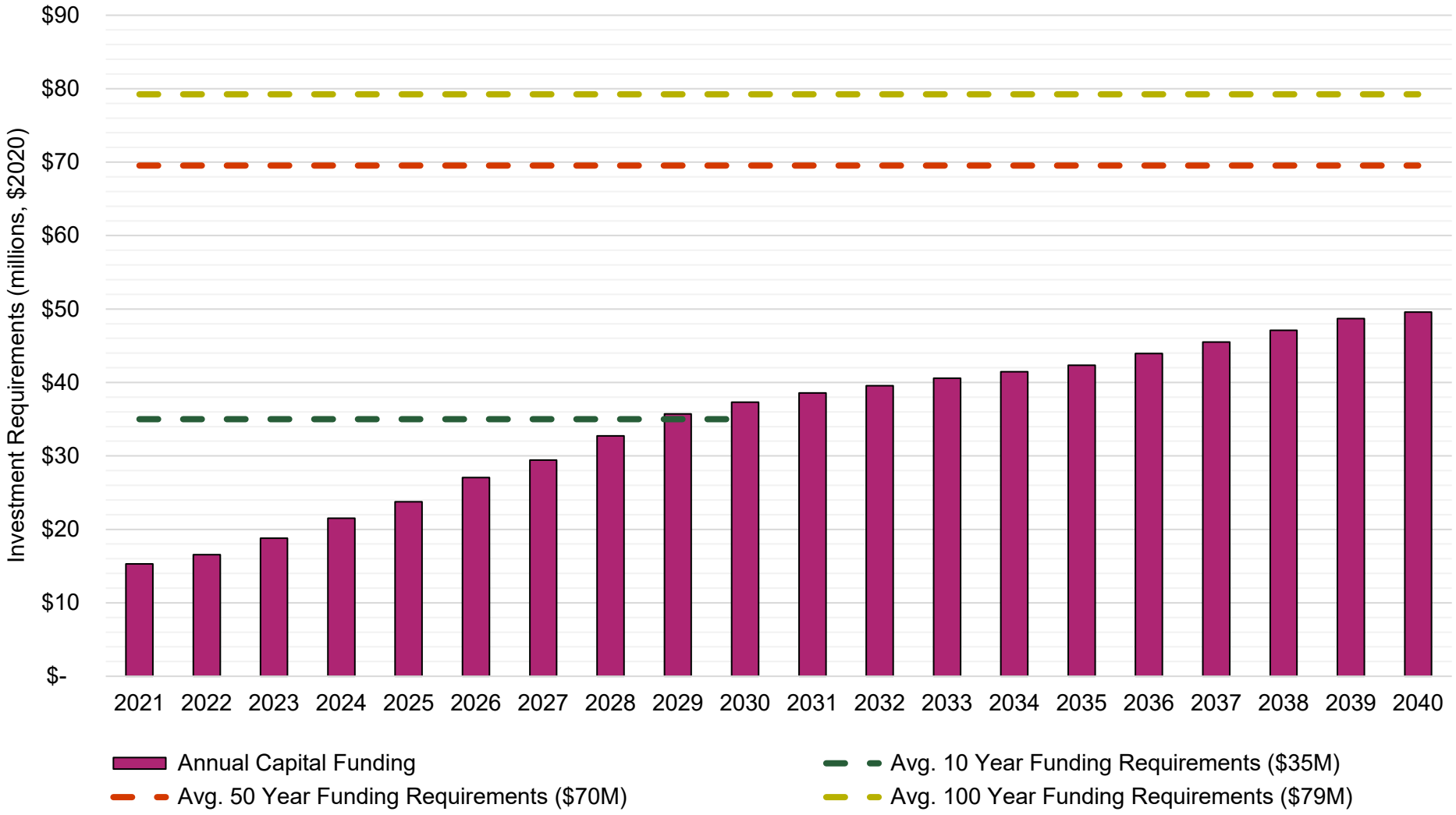
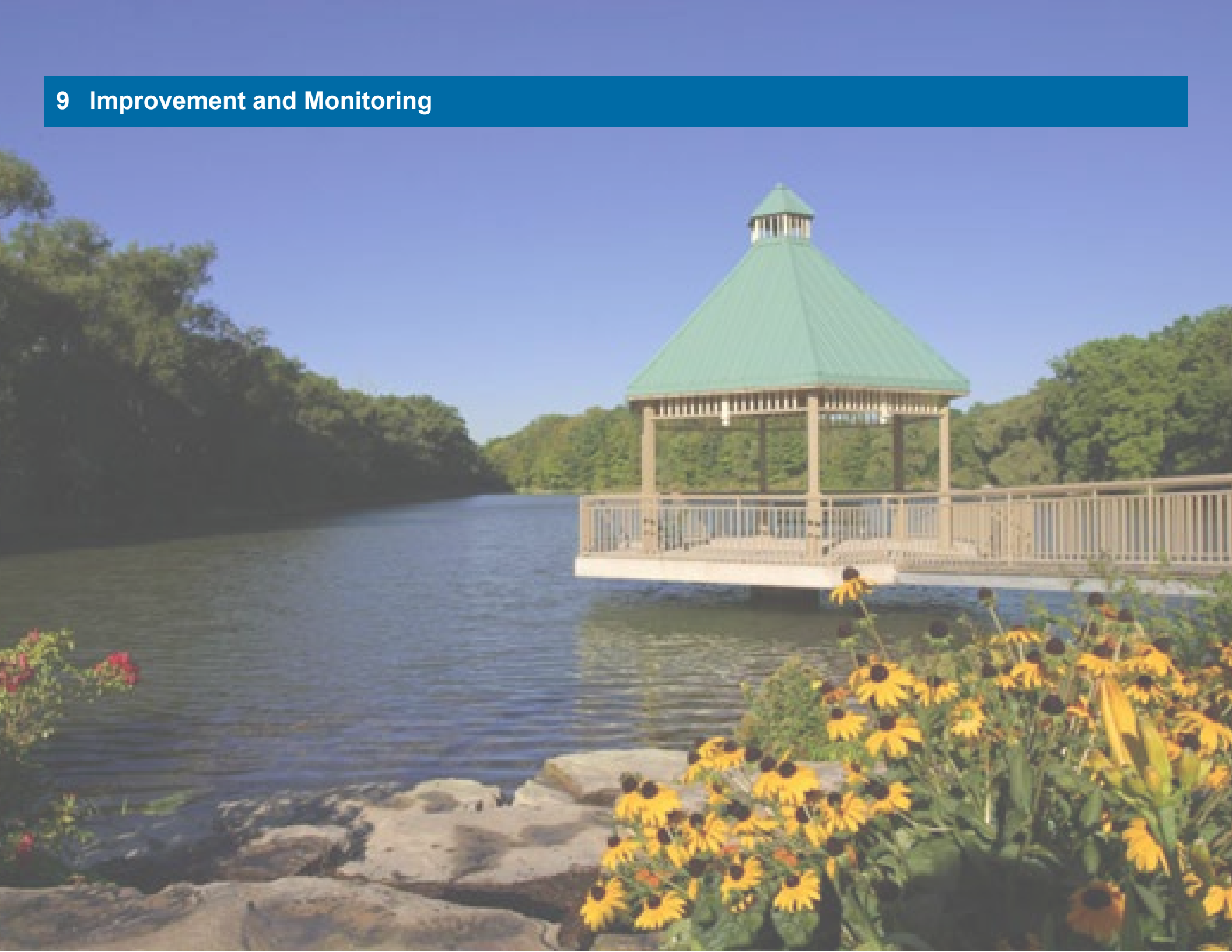


Figure 40: Growth Infrastructure Financing to Lifecycle Funding Requirements – Capital (millions, 2020$)

9 Improvement and Monitoring



9.1 PRIORITY AREAS FOR IMPROVEMENT BY ASSET TYPE

Several international standards released in recent years provide guidance for advancing asset management capabilities. These include:

- ISO 55000;
- International Infrastructure Management Manual (IIMM) 2015; and
- BSI PAS55:2008.

Each standard was developed over several years with international collaboration and are widely regarded as best practices for the field of strategic asset management planning. Each standard includes a framework and defines key principles of asset management against which an organization's maturity can be measured. This evaluation of maturity provides insight toward strengths and weaknesses, and how to advance key asset management capabilities. A similar maturity assessment was completed during the development of this Corporate AM Plan to identify performance gaps and strengths across the range of domains defined by these standards. Figure 41 illustrates the maturity scale used. It should be noted that this evaluation represents a corporate-wide perspective rather than a specific asset type or system.

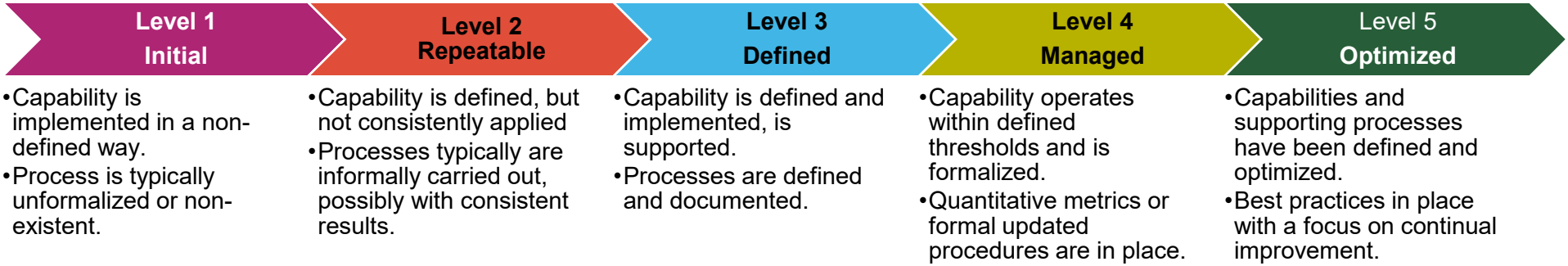


Figure 41: Maturity Scale

With the current and intended targets for the Town's asset management maturity defined, the following roadmap was developed at the completion of this Corporate AM Plan to help guide strategic decisions about where to invest limited funds, in relation to the Town's strengths and weaknesses. The fundamental intended change of these projects is to address the range of data required for evaluating and continually improving levels of service, condition, performance, and risk. This includes developing additional levels of service metrics to support service goals and how to collect and track this data, such as the length of roadways that include amenities for all modes (car, bike, pedestrian, bus). This data will directly improve future iterations of the Town's Corporate AM Plan, for both regulated and non-regulated assets.

Improvement & Monitoring

While the target maturity grades for the Town's management and information systems are not different than their current maturity levels, the following set of projects illustrated in Figure 42 will assist the Town in building a foundation for execution with key information needs and their supporting processes defined, documented, and implemented.

Table 57 provides further detail on each project and which asset categories are most likely to benefit from their implementation.

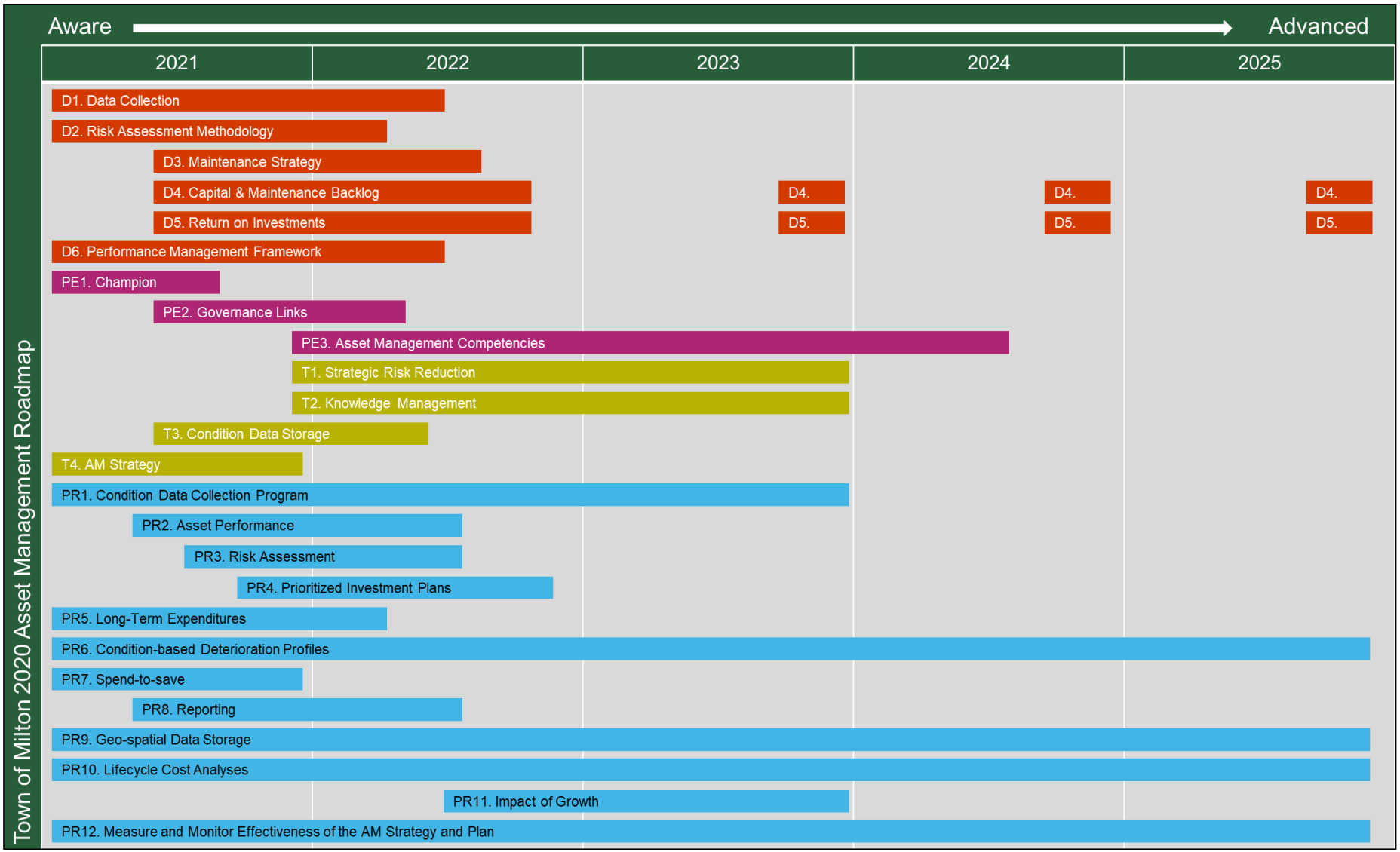


Figure 42: Asset Management Improvement Roadmap

Table 57: Asset Management Improvement Roadmap, Project Details

Category	Asset Management Roadmap for Continuous Improvement	Roads	Bridges	Traffic	Stormwater
Data	D1. Review and update data collection plans for existing asset information systems (i.e. asset registry and work management information and asset data).	✓		✓	✓
	D2. Develop a standardized risk assessment methodology.	✓	✓	✓	✓
	D3. Develop optimize maintenance strategy to ensure informed investments in efficiency upgrades by tracking operation and maintenance costs to specific assets.	✓			✓
	D4. Quantify capital maintenance backlog annually for compliance with regulatory reporting.	✓	✓	✓	✓
	D5. Review and quantify return on investment for environmental/sustainability related investments.				✓
	D6. Develop a performance management framework to evaluate over time the impact of investment levels on assets and levels of service.	✓	✓	✓	✓
People	PE1. Dedicate a champion, personnel or teams to implement the asset management plan and report its progress to Council.	✓	✓	✓	✓
	PE2. Develop and document governance linkages for capital project implementation, long-term asset stewardship and asset maintenance.	✓	✓	✓	✓
	PE3. Identify required asset management competencies and areas for development to continually improve adherence to asset management standards, policies and processes.	✓	✓	✓	✓
Tools	T1. Document and maintain asset and strategic risk management framework, review and implement mitigation actions, and report on the effectiveness in reducing risk over time.	✓	✓	✓	✓
	T2. Develop information and knowledge management systems, identifying opportunities to optimize and integrate use of asset management information technology tools and/or improve efficiencies for all lifecycle functions in tracking and information updates.	✓	✓	✓	✓

Improvement & Monitoring

Category	Asset Management Roadmap for Continuous Improvement	Roads	Bridges	Traffic	Stormwater
	T3. Develop a system to store condition data and to analyze this with respect to the parameters for levels of service.	✓	✓	✓	✓
	T4. Develop and document an AM Strategy and roadmap to ensure the provision of direction and leadership are focused on and achieve organizational objectives.	✓	✓	✓	✓
Process	PR1. Develop, document, and implement processes for collecting and maintaining asset condition in a cost-effective manor including critical assets.	✓	✓	✓	✓
	PR2. Develop measures and processes for tracking asset performance for asset groups including effective and residual lives.	✓	✓	✓	✓
	PR3. Develop, document, and implement processes for undertaking risk assessments for inclusion within AM planning processes.	✓	✓	✓	✓
	PR4. Develop prioritized capital and maintenance plans using a risk-based approach for the term of the Asset Management Plan.	✓	✓	✓	✓
	PR5. Develop long-term operation expenditure plan by reviewing and identifying operation impacts of planned capital projects.	✓	✓		✓
	PR6. Use condition information to improve asset deterioration models that can be used for life cycle planning.	✓			✓
	PR7. Review, identify, and report spend-to-save projects in the capital plan.	✓	✓	✓	✓
	PR8. Review document and implement process diagrams and flow charts for all lifecycle Asset Management functions including regulatory reporting to Council.	✓	✓	✓	✓
	PR9. Review processes to store geo-spatial data for all Asset Management data requirements and ensure install years is captured or estimated along with basic physical attributes including size, material, model number, etc.	✓	✓	✓	✓
	PR10. Identify operational challenges that can be addressed with capital investments and conduct life cycle cost analysis on potential solutions.				✓

Category	Asset Management Roadmap for Continuous Improvement	Roads	Bridges	Traffic	Stormwater
	PR11. Assess the impact of growth on the asset base for future levels of service for the Greater Golden Horseshoe Growth Forecast to 2041.	✓	✓	✓	✓
	PR12. Define, document, and implement processes to measure and monitor the effectiveness of the AM Strategy and AM Plans.	✓	✓	✓	✓

9.2 MONITORING: ROLES AND RESPONSIBILITIES

The Town of Milton ensures the public has an opportunity to attend council or committee meetings where asset management is discussed and approved. This is achieved through public notices, making agendas public before meetings, and encouraging attendance. The Town also makes its Corporate AM Plans available to the public prior to council meetings to promote understanding and preparation. The public is invited to provide feedback on asset management topics through surveys, delegations, and requesting written feedback.

Additional strategies for the execution, monitoring and control of asset investment and improvement plans are summarized in Table 58 below. In addition, underlying studies and reviews are completed for the specific services in order to perform a more detailed review of process and methodology.

Table 58: Key Strategies with Roles and Responsibilities for Monitoring, Control and Execution of the Corporate AM Plan

Stakeholder Group	Monitoring & Control	Execution
Town Council	• Monitor stakeholders and community needs • Monitor and support ongoing efforts to improve and implement the AM Plan	• Approve funding levels for both capital and operating budgets associated with Asset Management through the annual budget
Strategic Management Team	• Monitor and control the process of aligning asset management strategies and plans with organizational strategies and objectives	• Encourage engagement • Provide the necessary guidance necessary to ensure alignment and integration across the organization
Leadership Management Team (LMT)	• Monitor input on needs of department, current status of assets, and current levels of service	• Execute data collection requirements • Assist in the development of corporate asset management work plans pertaining to their areas of expertise

Improvement & Monitoring

Stakeholder Group	Monitoring & Control	Execution
		• Execute, monitor and document the alignment of asset management plans with the priorities established and project requested through the budget process
Chief Financial Officer & Treasurer	• Monitor and control capital and operating budgets associated with Asset Management through the annual budget	• Execute alignment between the Town's asset management financing pan to the Town's long-term financial plan
Staff involved in delivering the Town's Asset Management Program	• Monitor the Town's compliance with the regulation • Monitor and execute information sharing and collaboration across departments	• Execute the development and continuous improvement of future asset management plans • Facilitate input and direction to corporate asset management work plans to ensure consistency with other initiatives
Residents, Stakeholders and Customers	• Provide feedback on current levels of service • Actively engage with Town Council regarding desired levels of service and expected funding requirements • Attend meetings where asset management is being discussed or approved	• Provide feedback to develop an overarching vision of the type of community in which residents want to live, work, and play • Become aware of the various pressures and impacts associated with asset management • Shape the direction of the Town and understand the underlying asset management implications